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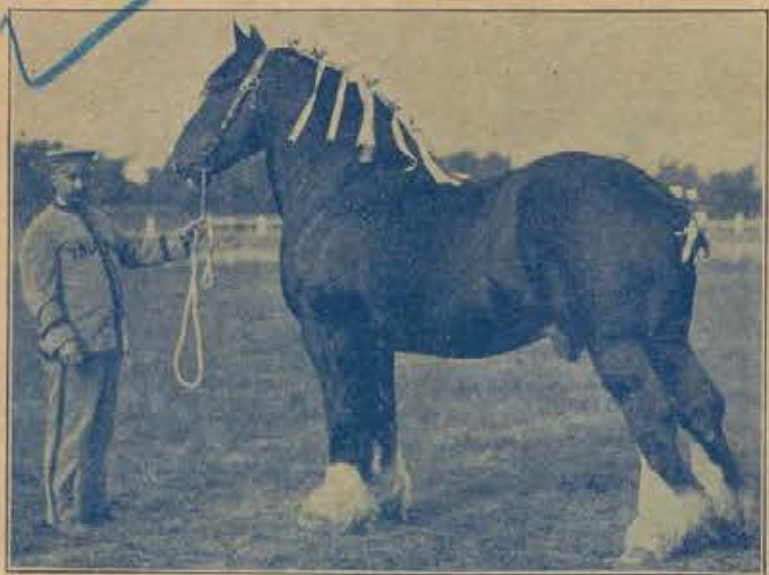
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FEEDING and JUDGING LIVE STOCK



AND VETERINARY GUIDE



Worth Its
Weight
in Gold



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FEEDING and JUDGING

LIVE STOCK

—AND—

**VETERINARY
GUIDE**

Worth Its Weight In Gold

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Des Moines, Iowa



GEORGE WILKES, founder of the great Wilkes family of trotters.

COMMON CAUSES OF DISEASE. Word has already been spoken of the need of accurate and prompt diagnosis of disease in the Horse. Some leading causes may be here enumerated. Copious drinking of cold water when the horse is warm, sudden chilling from rain or cool drafts, and indisposition are chief causes of Cramp Colic, or Spasmodic Colic. Overfeeding with green food, notably new hay or grain, indigestion, and over drinking when warm, cause Wind Colic, or Flatulence. Overeating, especially if following overexertion and sudden cooling, when standing unblanketed or from too much cold water while overheated, or by cold drafts in stables, cause Founder, or Laminitis. These are the principal food and drink diseases from over-indulgence.

Mouldy, sour food, impure water, damp quarters, and indigestion and infection due to bad teeth cause Diarrhoea, or Scours. Impure stagnant water, poor pasture, mouldy or late cut hay, and general debilitation result in Worms. These are the principal diseases of impure food or water. A catarrhal infection, caused by catching cold, especially during severe storms, and general debility from insufficient or improper food, is Distemper, or Strangles. Overtaxing strength, general debility, insanitary quarters, sudden chill from drafts on certain parts of the body, notably the flanks, cause Lung Fever. These are the principal diseases of the air-passages due to exposure and a run-down condition. Heaves, or Broken Wind, is another of this class, usually found in constantly used draught horses, especially among the hard pullers in teams, where an over supply of coarse food is given. Properly cared for, horses should never have heaves.

PROMINENT SYMPTOMS of those diseases of the Horse that may usually be first met by home treatment are as follows:

Sudden uneasiness, quick almost frightened looking back toward the flanks, restless pawing, sudden lying down and as abrupt getting up again, rolling rapidly and in a frightened manner, apparent straining for urination (often mistaken for some kidney or bladder disease) and a general condition of alarm coming on suddenly, but relieved by periods of entire ease, tell of Cramp or Spasmodic Colic.

Much the same symptoms at first, but coming on slowly, with only slight uneasiness, the horse appearing stupid and dull, slow, difficult breathing with often profuse sweats, trembling legs and a staggering walk, with the belly distended like a drum are the symptoms of Wind or Flatulent Colic. The two forms of Colic are best diagnosed by the suddenness of the seizure from Cramp Colic and the greatly distended belly in Wind Colic.

Troubles in the breathing apparatus usually indicate Lung Fever, Distemper, or the Heaves. The spasmodic breathing of the latter, the air being taken in naturally, but being expired (driven outward) with two spasmodic efforts, often with a short grunt or cough, characterizes and easily identifies the Heaves. Legs wide-spread, head hanging low, wildly staring, frightened eyes, later becoming dull, sunken, almost glassy, high fever, a pounding pulse, rapid breathing, deep-colored urine and a tendency to constipation, all speak loudly of Lung Fever (pleuro-pneumonia). This calls for the quick summoning of the skilled veterinarian. The symptoms of Distemper in animals, much alike in all, are too well known to call for description here. Running from the nose and eyes, accompanied by a short, dry, barking cough are very characteristic symptoms of Distemper.

The common intestinal troubles are Founder, Worms, and Diarrhoea, or Scours. The former is easily told by the stiffness and lameness of the victim, hot, dry feet, very evident acute suffering, absolute inability to travel or even to move in bad cases, and suppuration of the foot membranes in the final fatal stages. Here, also, the skilled practitioner should be had with all speed. There is not the apparent need of immediate relief in Worms, as in the foregoing. The early stages partake somewhat of the appearance of the Colics; nervous switching of the tail, rubbing its root against fences and trees, a hide

bound, pot bellied appearance, with no shedding of the coat when curried, all tell of the presence of parasitic Worms. Loose bowels, emaciation, great weakness and weariness, with often very watery passages indicate Diarrhoea, or the Scours.

In the hottest weather the Horse, hard working in the field or rapidly driven along the road, may stop suddenly, pant violently, spread his legs far apart, totter on unsteady limbs, and even drop suddenly to the ground. This is congestion of the brain, or Sunstroke, and is very apt to result in early death, if the case be a severe one and aid be not quick at hand. With the head low between the forelegs, bulging eyes, the pupils smaller than usual, dilated nostrils and panting sides, violently beating but irregular pulse, strong then weak, Sunstroke is easily diagnosed.

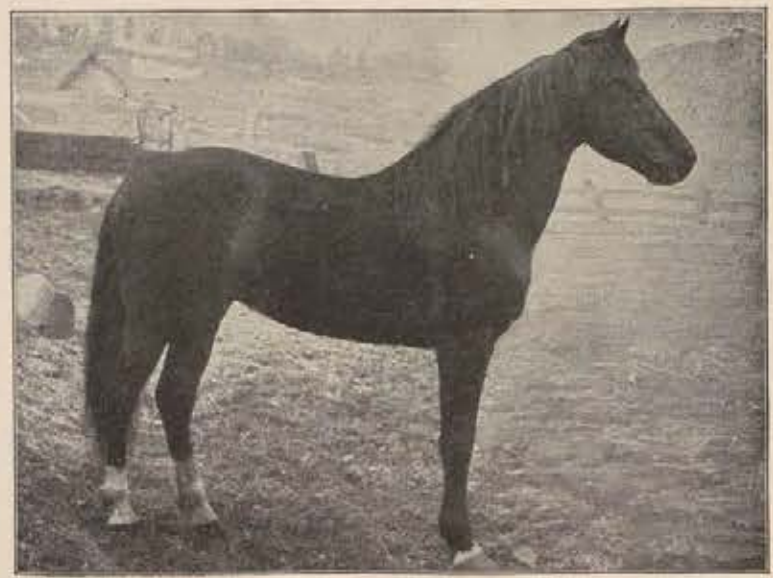
INJURIES, WOUNDS, AND LAMENESS are too diverse in their manifestations for us to describe all their intricate symptoms here. They can be sufficiently indicated under the various methods of treatment, to follow. Most of them are of slight importance and respond readily to home remedies and treatment.

ORDINARY HOME REMEDIES for the Horse are those for the diseases above described and for

the injuries and wounds of common occurrence. They will be taken in the order, already used in the foregoing diagnostic descriptions.

CRAMP OR SPASMODIC COLIC calls for the earliest possible relief. A heavy dose of Jamaica ginger, or even of a half pint of whiskey, in hot water is quite sure to give temporary and welcome aid. Follow either of these with an ounce of sulphuric ether, hourly for three or four hours. If good results are had follow with a pint of raw linseed oil. A rectal injection of warm soapy water is advised by some. Follow these with two tablespoonfuls of aromatic spirits of ammonia, every hour for three or four times. If, after the administration of the sulphuric ether good results are not manifest, hasten the coming of the veterinarian.

WIND COLIC OR FLATULENCE. For the first treatment give a tablespoonful of common baking soda and an abundance of powdered charcoal. Follow with a good strong physic, a pint of linseed oil, or an ounce of aloes. A rectal injection of two ounces of turpentine in eight ounces of the raw linseed oil will usually produce excellent results. Aromatic spirits of ammonia, two tablespoonfuls hourly for four or five doses, with blankets wrung out in very hot water, applied every ten minutes over the loins, is a treatment also highly recommended. **THE HEAVES, or Broken Wind,** is not entirely curable;



MORGAN HORSE, HILLSIDE, winner at Illinois State and Chicago Shows.

the vapor, arising from hay in boiling water, produce excellent results, care being taken to avoid chilling afterwards.

FOUNDER, or Laminitis, more than almost any disease of the Horse, calls for the ounce of prevention that will render the pound of slow relief unnecessary. Immediately upon discovering that a horse is foundered he should be made comfortable in a warm, dry stall. Hot water applications to the feet for eight hours, or so, are called for in case of their slight congestion; if, however, congestion is considerable the feet should be kept in a bath of cold water for several hours. Bran mash and ample cold drinking water for at least a week are called for; and for four or five days swabs of cloths, freshly wet half-hourly with cold water, should be kept on the feet. A horse should be used lightly and carefully for quite a month after foundering.

WORMS call for building up the system, quite as well as for the ejection of these parasites. A good, strong tonic, or some first-class condition powder is required for this purpose. First give a good drench; three ounces of raw linseed oil in which is one ounce of turpentine is excellent. Follow this with an ounce of aloes, and repeat both doses twice daily for three to five days. An infusion of tobacco used as a rectal injection often has a most helpful effect. Keep it up, until the worms are expelled.

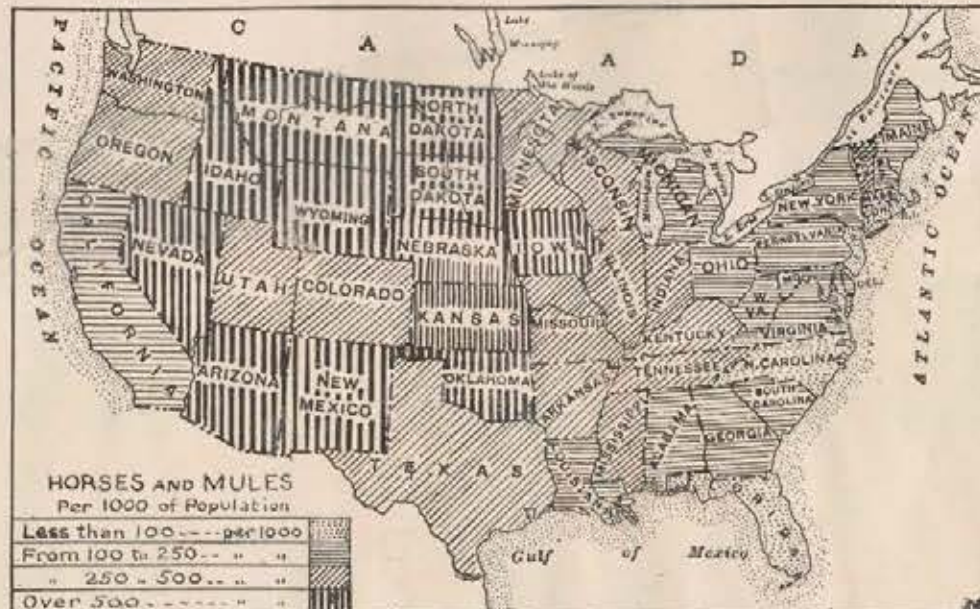
DIARRHOEA, or the Scours, call first for great care in feeding and in the drinking water. Ten grains of pulverized opium in five drachms of powdered chalk should be given every three hours. This may be followed by milder remedies, such as white oak bark tea, or unbolts wheat flour in water. Ample rest is also necessary.

SUNSTROKE. Rapid application of water, as cold as possible, thrown over the whole body of the horse, especially on the back of the head and upper spine, is first called for. Vigorous rubbings of the limbs and sides with hugging, or coarse cloths, should follow. Then repeat the douching with water. Authorities highly recommend the injection of from thirty to sixty grains of quinine under the skin with a hypodermic syringe. During the worst depression a prompt stimulant is called for; the following is highly recommended: two ounces of sulphuric ether in a pint of water, used as a drench. As well spoken of is twenty drops of tincture of aconite in a pint of ale, or beer. Afterwards the horse should be turned out to pasture where there is ample shade; and he should not be used later in the hot sun, as Sunstroke is most likely to easily overcome the horse, once the victim of it.

LAMENESS calls for very immediate attention, and while rest is the principal factor in recovery it is a factor that should be availed of at once. The leg mechanism of the Horse is fragile, in comparison with his great strength and all that is expected of him in work. Hence it is very easy to so increase lameness, by carelessness or neglect, as to render it permanent. Gentle, but firm rubbing with a good liniment frequently aids somewhat, but ample rest is the keynote to a cure.

CUTS FROM WIRE-FENCE and like injuries, should have the lacerated edges that will not readily heal trimmed away, the wounds carefully cleansed with an antiseptic wash, (carbolic acid, one part in 2.0 of water) and the wound stitched together, if at all possible. An ounce each of tar and vasoline, with a drachm of carbolic acid added makes an excellent healing lotion. Others highly recommend oiling the sore thinly with vasoline and dusting over it a powder of 1 drachm of bismuth, 30 grains of zinc oxide, and 40 grains of calomel, thoroughly mixed.

OLD SORES. While the above will answer well for fresh, clean sores, old sores, especially with proud flesh, require a stronger ointment; the following is excellent: 2 ounces of resin and 1 ounce of corrosive sublimate, thoroughly mixed, dusted on lightly, left on for 48 to 60 hours, then washed off carefully and followed by the above healing ointment. Repeat every 5 to 7 days, if necessary. Corrosive sublimate is a very dangerous poison.

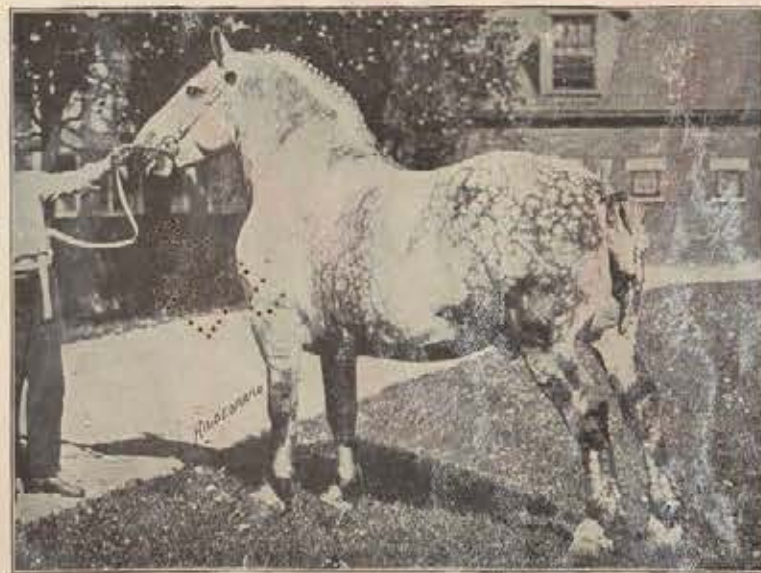


but it may be so treated that the horse will be brought into such condition as to do a fair amount of work in comparative comfort. In very mild cases what is almost an entire cure will result; but the Heaves are quite sure to return with renewed violence, unless great care and easy work are the horse's lot. Turned out to pasture and fed laxative foods (cornstalks, for example) the horse will rapidly recover from a mild case. If a season of pasturing is not possible, very small supplies of water, and dry grain, with feeding of beets, potatoes, carrots, turnips, and like root crops, will be found very helpful. Periods of spinal oppression in breathing should be relieved by sedatives. The horse must always be kept of free action, and the stable very clean and well aired. Clean, sweet hay should be given very sparingly and only at night.

The following is highly recommended for the Heaves by several authorities. Take a half-ounce of black antimony, one ounce each of indigo and tartar emetic, and two ounces each of elecampane, Spanish brown, and nitrate of potash; pour all into a mortar and thoroughly grind. Add three ounces of licorice powder, mix very thoroughly and pass through a fine sieve. For three days give the horse a teaspoonful twice daily, then daily for three days, and then a dose every three days until cured.

LUNG FEVER is a most serious disease and should have the early attention of the skilled veterinarian. In the meantime an equable temperature with blankets, and a well ventilated but not draughty stable are of prime importance. Keep up the circulation by rubbing the legs with the hand and with applications of a hot liniment, such as flannel bandages, twice daily. A blanket wrung out in hot water, applied over the chest and covered by a dry blanket, changed every half hour for six or eight times will usually be found very beneficial. Bran mash, scalded oats, and green feed if possible, should be given.

DISTEMPER, or Strangles, calls mainly for soft food (grass, alfalfa hay, bran mash, etc.) and for thorough protection from draughts, colds, or inclement weather. If the bowels are not free in action a handful of Glauber salts, thrice daily, is the dose for a grown horse. Where there is much discharge from the nostrils, warm poultices of the neck, or a warm water bath from



PERCHERON STALLION, HAUTOBOIS, winner at International Exposition 1911.

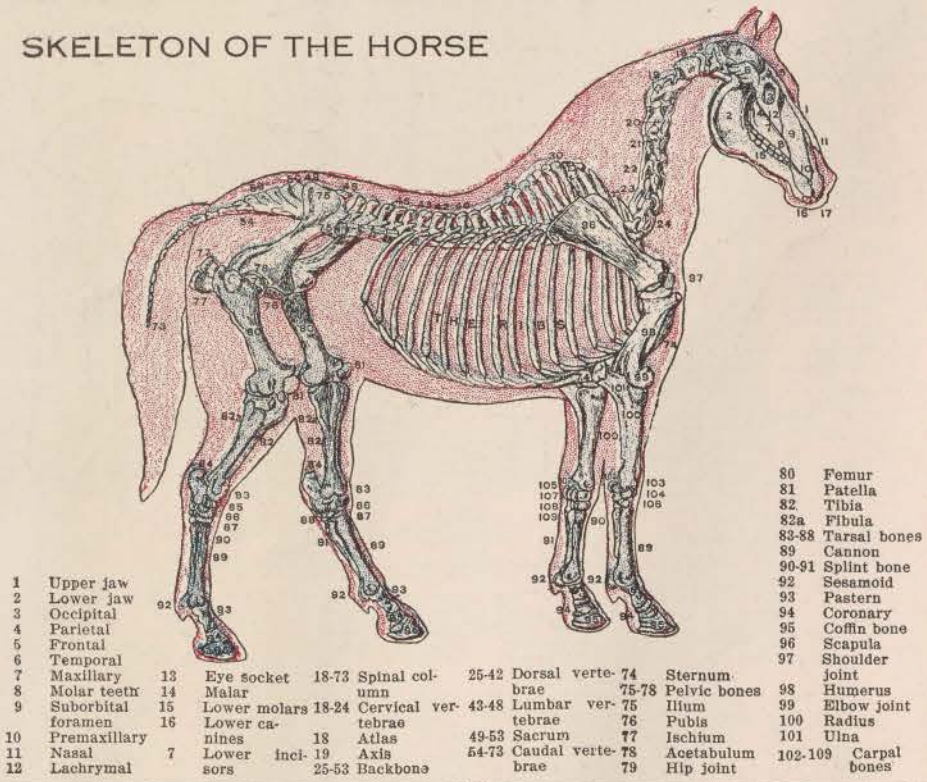


HACKNEY STALLION, ROYAL DANEGELT, winner at many English shows.

THE HORSE IN HEALTH AND DISEASE

Physiology and Hygiene of the Horse

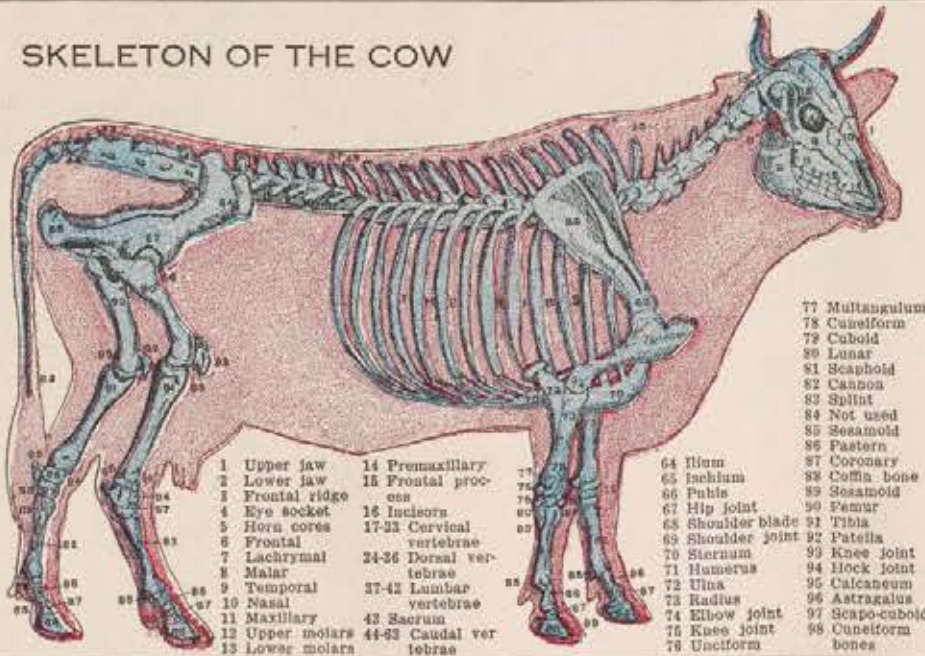
SKELETON OF THE HORSE



THE COW IN HEALTH AND DISEASE

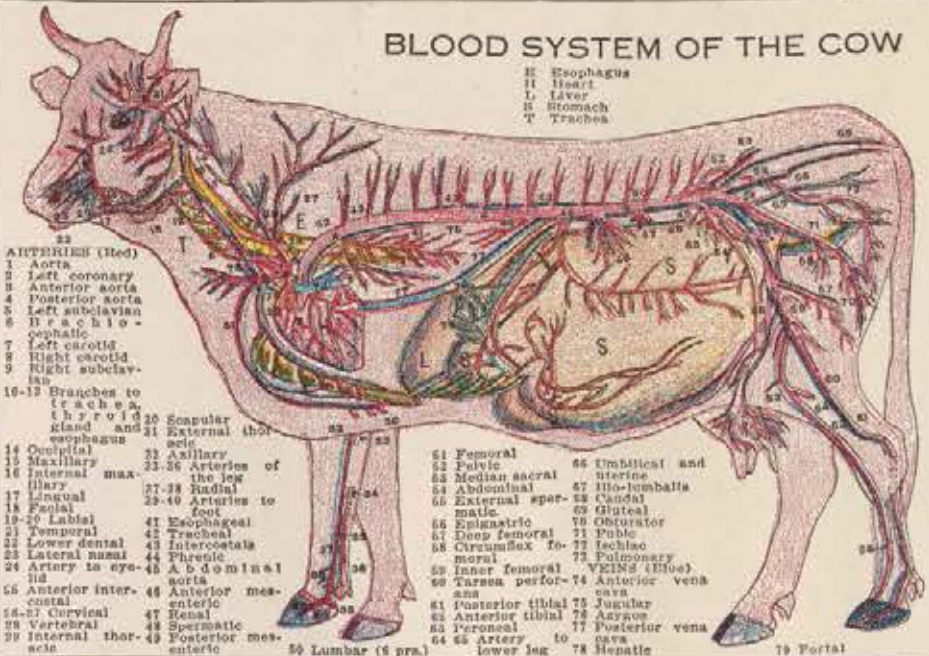
Physiology and Hygiene of the Cow

SKELETON OF THE COW



- | | | |
|-----------------|------------------------|--------------------|
| 1 Upper jaw | 14 Premaxillary | 77 Multisagulum |
| 2 Lower jaw | 15 Frontal process | 78 Cuneiform |
| 3 Frontal ridge | 16 Incisor | 79 Cuboid |
| 4 Eye socket | 17 Cervical vertebrae | 80 Lunar |
| 5 Horn cores | 24-26 Dorsal vertebrae | 81 Scaphoid |
| 6 Frontal | 37-42 Lumbar vertebrae | 82 Cannon |
| 7 Lachrymal | 44-45 Caudal vertebrae | 83 Splint |
| 8 Malar | | 84 Not used |
| 9 Temporal | | 85 Sesamoid |
| 10 Nasal | | 86 Pastern |
| 11 Maxillary | | 87 Coronary |
| 12 Upper molar | | 88 Coffin bone |
| 13 Lower molar | | 89 Sesamoid |
| | | 90 Femur |
| | | 91 Tibia |
| | | 92 Patella |
| | | 93 Knee joint |
| | | 94 Humerus |
| | | 95 Calcaneum |
| | | 96 Astragalus |
| | | 97 Scapulo-cuboid |
| | | 98 Cuneiform bones |
| | | 99 Ulna |
| | | 100 Radius |
| | | 101 Elbow joint |
| | | 102 Knee joint |
| | | 103 Ulniform |

BLOOD SYSTEM OF THE COW



- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 1 Aorta | 2 Left coronary | 3 Anterior aorta | 4 Posterior aorta | 5 Left subclavian | 6 Right subclavian | 7 Left carotid | 8 Right carotid | 9 Left subclavian | 10-12 Branches to trachea, thyroid gland, and esophagus | 13 Scapular artery | 14 Axillary artery | 15 Internal maxillary | 16 External maxillary | 17 Lingual | 18 Facial | 19 Labial | 20 Temporal | 21 Lower dental | 22 Lateral nasal | 23 Artery to eye | 24 Anterior intercostal | 25 Cervical | 26 Vertebral | 27 Internal thoracic | 28 Scapular | 29 External thoracic | 30 Axillary | 31-32 Arteries of the leg | 33 Radial | 34 Ulnar | 35 Arteries to foot | 36 Esophageal | 37 Tracheal | 38 Intercostal | 39 Phrenic | 40 A. b. domin. aorta | 41 Anterior mesenteric | 42 Renal | 43 Spermatic | 44 Posterior mesenteric | 45 Lumbar (6 pra.) | 46 Femoral | 47 Deep femoral | 48 Circumflex femoral | 49 Epigastric | 50 Pubic | 51 Tarsal | 52 Inner femoral | 53 Tarsal perforator | 54 Posterior tibial | 55 Anterior tibial | 56 Peroneal | 57 Artery to lower leg | 58 Umbilical and uterine | 59 Ilio-lumbalis | 60 Caudal | 61 Gluteal | 62 Obturator | 63 Pubic | 64 Iliac | 65 Pelvic | 66 Vagina | 67 Uterus | 68 Ovary | 69 Fallopian tube | 70 Vagina | 71 Uterus | 72 Ovary | 73 Fallopian tube | 74 Vagina | 75 Uterus | 76 Ovary | 77 Fallopian tube | 78 Vagina | 79 Uterus | 80 Ovary | 81 Fallopian tube | 82 Vagina | 83 Uterus | 84 Ovary | 85 Fallopian tube | 86 Vagina | 87 Uterus | 88 Ovary | 89 Fallopian tube | 90 Vagina | 91 Uterus | 92 Ovary | 93 Fallopian tube | 94 Vagina | 95 Uterus | 96 Ovary | 97 Fallopian tube | 98 Vagina | 99 Uterus | 100 Ovary |
|---------|-----------------|------------------|-------------------|-------------------|--------------------|----------------|-----------------|-------------------|---|--------------------|--------------------|-----------------------|-----------------------|------------|-----------|-----------|-------------|-----------------|------------------|------------------|-------------------------|-------------|--------------|----------------------|-------------|----------------------|-------------|---------------------------|-----------|----------|---------------------|---------------|-------------|----------------|------------|-----------------------|------------------------|----------|--------------|-------------------------|--------------------|------------|-----------------|-----------------------|---------------|----------|-----------|------------------|----------------------|---------------------|--------------------|-------------|------------------------|--------------------------|------------------|-----------|------------|--------------|----------|----------|-----------|-----------|-----------|----------|-------------------|-----------|-----------|----------|-------------------|-----------|-----------|----------|-------------------|-----------|-----------|----------|-------------------|-----------|-----------|----------|-------------------|-----------|-----------|----------|-------------------|-----------|-----------|----------|-------------------|-----------|-----------|----------|-------------------|-----------|-----------|-----------|

The position of the Cow in our Nation has greatly changed during the past century. Called on in the earlier days to draw many a trackless wilderness and later to break that wilderness with the first furrows of the plow, today she is allowed for the most part to devote her energies alone to food production, to supplying meat, milk, butter and cheese. Always she has been among our most helpful domestic companions; today, her increase and health have as much to do with the dread question of the high cost of living as has any product of our farms. As with many such products, the day of intensive farming is dawning for the Cow, and a knowledge of her structure and of her ills and ailments are of prime importance to us all.

THE PLATES that are here shown graphically illustrated in colors, and by a system of numbers and their corresponding names, the bony structure, the circulatory system, (arteries and veins), the muscular mechanism, the digestive, brain and spinal structures, and the exterior, upon which the grosser outer anatomy or parts are indicated. They should be carefully studied and their various relationships be compared.

THE GENERAL CARE of the Cow must vary with the purpose for which she is being kept. Naturally, it makes considerable difference whether this be for fattening and food, for dairying or for breeding. Of fattening cattle it has been said that "a good bed is half fed," and this is very true, inasmuch as warmth and quiet combine to aid in the making of solid flesh. But of breeding stock an authority tells us to stable them as little as possible; how little must depend on the latitude, climate and season. Good shelter is a prime necessity for the dairy cow and the young, growing animal, but an open shed, away from driving winds and storms, is to be preferred to a poorly ventilated and ill-lighted stable, no matter how warm. Cold is not alone to be avoided, the intense heat of the summer sun and the irritation of flies are always detrimental, especially to the very young calf. The latter's arrival should be anticipated, the mother should have ample care in comfortable quarters, and too much solicitude cannot be shown during the early weeks of the little fellow's life.

FOOD AND WATER require much attention and careful observation, calling for constant modification. Periods of growth

alternating with a stagnation in development are to be prevented, if possible, a gradual, steady growth, maintained by food of suitable character and quantity, is to be aimed at constantly. If the calf be hand-raised, not allowed to suck its mother, care must always be had to see that the milk is of the consistency as first taken from the udder. Overfeeding the calf is quite as much to be guarded against as underfeeding. A small portion of oil meal added from time to time is highly recommended by

this is due to a depraved, abnormal thirst, sure to result in dire consequences in time. Pure, fresh water is necessary to growth and health, and especially to that of the dairy cow. The time of watering is not of great importance; a cow is not apt to suffer from over-drinking as will a horse. In very cold climates the intense chill of winter water may be reduced; but cool water is always the best. It can neither be too cold or too plentifully given in case of fever.

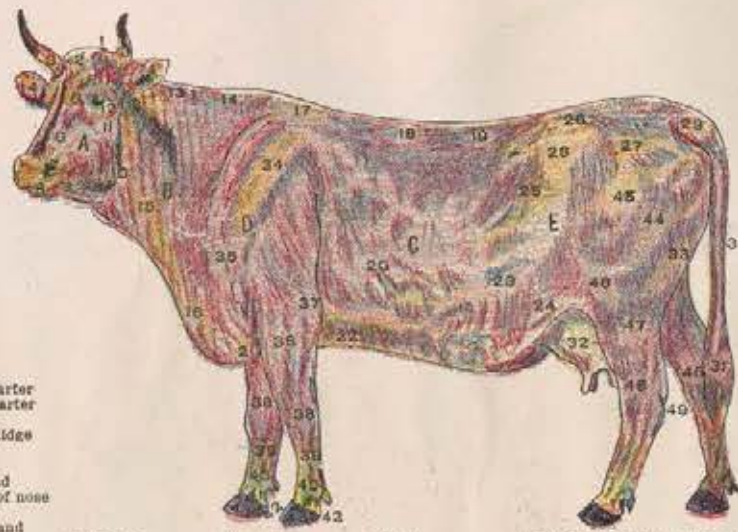
contagions and infections. The well-known adage might be changed to read, in the case of farm animals, "an ounce of prevention is worth a ton of cure," this especially applies to the first two causes, above. By painstaking care with regard to these, feeding and shelter, the stock raiser can feel assured of sound and profitable stock under almost all circumstances. In the comparatively few cases where it results otherwise, it should be remembered that an untrained person should give medicine very cautiously; and in all severe cases a veterinary surgeon should be sent for promptly.

THE COMMON DISEASES are often treated by home remedies, without the aid of the veterinarian or while he is on his way. As accurate diagnosis is, of course, of first importance, and as the diseases of cattle often baffle even professional skill at first, this is by no means a simple matter. Care must therefore be taken that the diagnosis be certain. Those troubles that are most characteristic and to be most readily diagnosed are such as Diarrhoea (scours or dysentery), Constipation (especially in calves), Malignant Anthrax (splenic fever or splenic apoplexy), Symptomatic Anthrax (black leg or black quarter), Bloat (tympanitis or hovey), and Big Jaw (lumpy jaw or actinomycosis).

All of the above are diseases that are greatly reduced in seriousness, if not entirely prevented, where care in feeding and housing are made matters of prime importance. Constipation in calves is a case in point, where the care and food of the expectant mother and a few days' care with the calf will reduce the trouble to a very small percentage. So, too, diarrhoea, or dysentery, is of the greatest danger in the young calf, where it causes great mortality. Calves closely housed are especially liable to its inroads. Irregular feeding, over-feeding, hand-feeding from unclean pails, poorly ventilated, dark and damp quarters are all sources of this dread trouble. In some cases, acting as though an infection, it carries off nearly every calf in the herd, if they are kept close together.

TO RECAPITULATE: An abundance of fresh air, plenty of sunlight, freedom from chilling draughts in sleeping quarters, ample, well-chosen, and pure food, and the quick isolation of any suddenly sick member of the herd, will assure a great percentage of success in cattle raising.

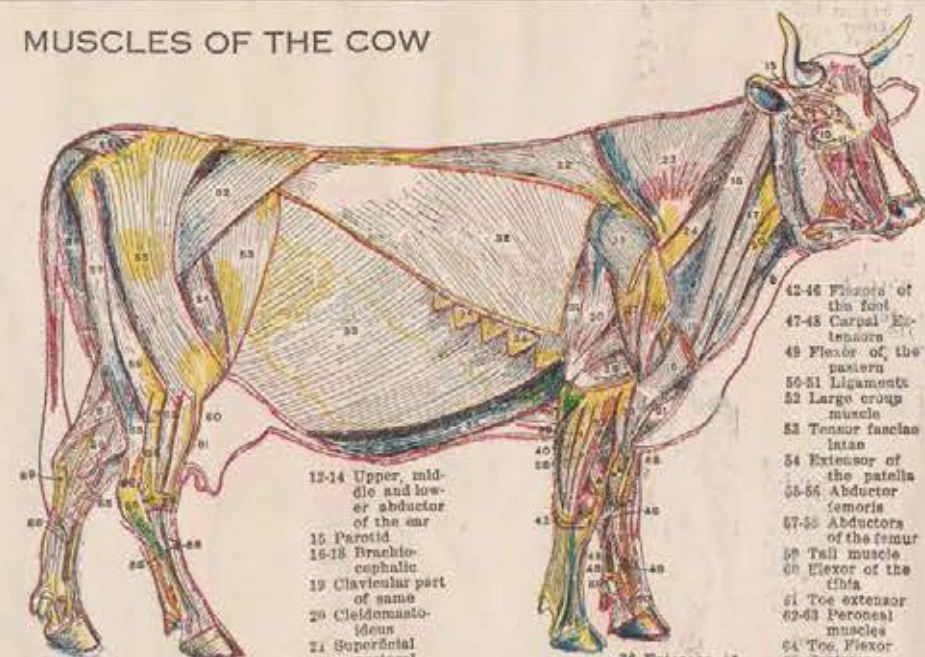
EXTERIOR OF THE COW



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|--------------------|------------------|--------------------|---------------|-------------------|----------------|
| A Head | 15 Throat | 22 Chest | 29 Hip | 36 Shoulder joint | 43 Hoof |
| B Neck | 16 Dewlap | 23 Belly | 30 Tail head | 37 Arm | 44 Thigh |
| C Barrel | 17 Withers | 24 Flank | 31 Tail | 38 Elbow | 45 Thigh joint |
| D Forequarter | 18 Back | 25 Hollow of flank | 32 Brush | 39 Knee | 46 Stifle |
| E Hindquarter | 19 Loin | 26 Sacrum | 33 Udder | 40-41 Fetlock | 47 Gaskin |
| 1 Poll | 20 Wall of chest | 27 Croup | 34 Escutcheon | 42 Crown of hoof | 48 Hock |
| 2 Horn Ridge | 21 Brisket | | 35 Shoulder | | 49 Heel |
| 3 Horns | | | | | |
| 4 Ears | | | | | |
| 5 Forehead | | | | | |
| 6 Bridge of nose | | | | | |
| 7 Nostril | | | | | |
| 8 Mouth and muzzle | | | | | |
| 9 Lower lip | | | | | |
| 10 Jaw | | | | | |
| 11 Cheek | | | | | |
| 12 Eyes | | | | | |
| 13 Neck | | | | | |
| 14 Crest of neck | | | | | |

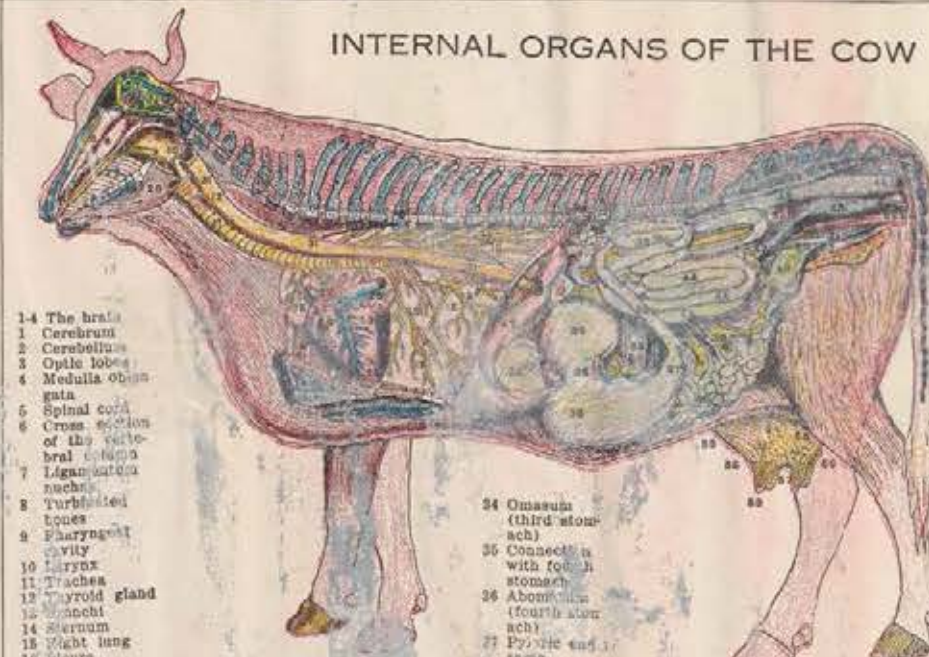
the best authorities for its growth producing qualities. It is a great mistake to think that any water supply will do, some point to the fact that cattle will at times drink the barnyard drainage. In proof of this contention. But

MUSCLES OF THE COW

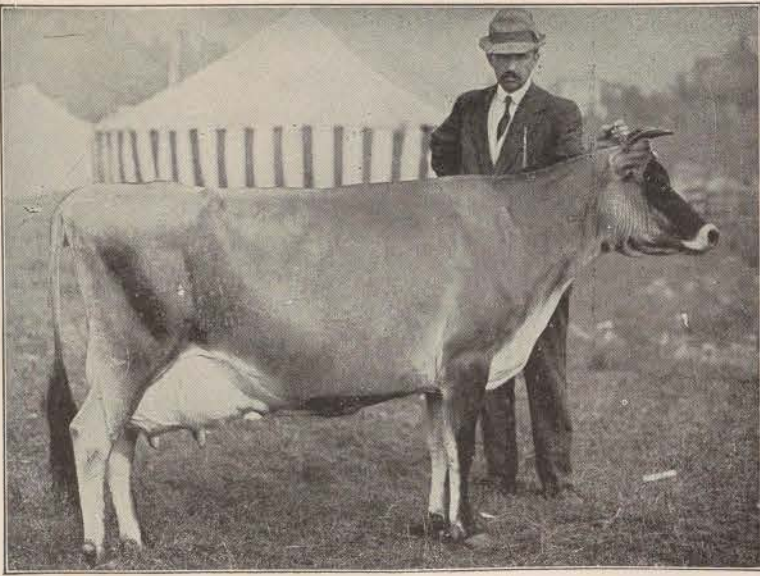


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| 1 Levator of the lip | 5 Cheek muscle | 12-14 Upper, middle and lower abductor of the ear | 22-23 Triceps | 24 Levator of the shoulder blade | 25-26 Infraspinatus | 27-28 Abductor of the humerus | 29-31 Forearm extensors | 32 Latissimus dorsi | 33 Oblique abdominal | 34 Large serratus | 35 Deep pectoral | 36 Extensor of the radius | 37-39 Extensors of the foot | 40 Carpal extensor | 41 Oblique carpal extensor | 42 Tendon of Achilles | 43 Flexor of the foot | 44-45 Carpal extensors | 46 Flexor of the pastern | 50-51 Ligaments | 52 Large crural muscle | 53 Tensor fasciae latae | 54 Extensor of the patella | 55-56 Abductor femoris | 57-58 Adductors of the femur | 59 Tail muscle | 60 Flexor of the tibia | 61 Toe extensor | 62-63 Peroneal muscles | 64 Toe flexor | 65 Gastrocnemius | 66 Osseous | 67 Ligaments | 68 Inner gastrocnemius | 69 Posterior tibia | 70 Tendon of Achilles | 71 Left ventricle | 72 Right ventricle | 73 Apex of the heart | 74 Mouth cavity | 75 Tongue | 76 Gums | 77 Pharynx | 78 Esophagus | 79 Ret. lum. (rectum) | 80 Colon | 81 Cecum | 82 Caecum | 83 Omentum | 84 Pancreas | 85 Gall bladder | 86 Duodenum | 87 Jejunum | 88 Ileum | 89 Cecum | 90 Caecum | 91 Omentum | 92 Pancreas | 93 Gall bladder | 94 Duodenum | 95 Jejunum | 96 Ileum | 97 Cecum | 98 Caecum | 99 Omentum | 100 Pancreas |
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INTERNAL ORGANS OF THE COW



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| 14 The brain | 1 Cerebrum | 2 Cerebellum | 3 Optic lobes | 4 Medulla oblongata | 5 Spinal cord | 6 Cross section of the vertebral column | 7 Larynx | 8 Trachea | 9 Thyroid gland | 10 Esophagus | 11 Stomach | 12 Duodenum | 13 Jejunum | 14 Ileum | 15 Cecum | 16 Caecum | 17 Omentum | 18 Pancreas | 19 Gall bladder | 20 Duodenum | 21 Jejunum | 22 Ileum | 23 Cecum | 24 Caecum | 25 Omentum | 26 Pancreas | 27 Gall bladder | 28 Duodenum | 29 Jejunum | 30 Ileum | 31 Cecum | 32 Caecum | 33 Omentum | 34 Pancreas | 35 Gall bladder | 36 Duodenum | 37 Jejunum | 38 Ileum | 39 Cecum | 40 Caecum | 41 Omentum | 42 Pancreas | 43 Gall bladder | 44 Duodenum | 45 Jejunum | 46 Ileum | 47 Cecum | 48 Caecum | 49 Omentum | 50 Pancreas | 51 Gall bladder | 52 Duodenum | 53 Jejunum | 54 Ileum | 55 Cecum | 56 Caecum | 57 Omentum | 58 Pancreas | 59 Gall bladder | 60 Duodenum | 61 Jejunum | 62 Ileum | 63 Cecum | 64 Caecum | 65 Omentum | 66 Pancreas | 67 Gall bladder | 68 Duodenum | 69 Jejunum | 70 Ileum | 71 Cecum | 72 Caecum | 73 Omentum | 74 Pancreas | 75 Gall bladder | 76 Duodenum | 77 Jejunum | 78 Ileum | 79 Cecum | 80 Caecum | 81 Omentum | 82 Pancreas | 83 Gall bladder | 84 Duodenum | 85 Jejunum | 86 Ileum | 87 Cecum | 88 Caecum | 89 Omentum | 90 Pancreas | 91 Gall bladder | 92 Duodenum | 93 Jejunum | 94 Ileum | 95 Cecum | 96 Caecum | 97 Omentum | 98 Pancreas | 99 Gall bladder | 100 Duodenum |
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JERSEY COW, BOSNIAN'S ANNA

THE COMMON DISEASES of Cattle, as we have already seen, are those due mainly to careless and unwise feeding, to exposure and stabling neglect, to contagion, and to parasites. Of those diseases capable of home treatment, or of immediate alleviation or of temporary relief while the veterinarian is on his way, the following symptoms may be described and classified:

SYMPTOMS OF INTESTINAL DISEASES of easy relief are of the two, entirely opposite kinds—Diarrhoea and Constipation. The former causes much anxiety among cattle raisers where it appears, as most frequently it does, among the young animals. Calves appear to be more subject to the serious inroads of this disease than do any other of the domestic animals. Dysentery, or Scours, as the disease is often called, frequently takes on the appearance of an infectious disease; and not uncommonly such a visitation attacks practically every calf in the herd. This is the more likely to be the case where the calves are closely housed together, especially in low-lying and in damp districts. Coming on suddenly, usually before the calf is ten days or two weeks old, it is characterized by very fluid and highly offensive, light colored evacuations, which become very frequent and are often accomplished only after severe straining. The poor little creature is greatly weakened, lies down most of the time, loses flesh rapidly, and shows many signs of profound distress. Deep sunken eyes, uneasy breathing, and entire loss of appetite are other symptoms. If not entirely relieved during an early stage of the disease, death will soon follow.

If, after the second or third day of its life the calf refuses to suck the mother, appears exceedingly uneasy, keeps up a more or less continuous moaning, spends much of its time prone, is constantly making futile efforts toward evacuating the bowels, breathes hurriedly and often painfully, Constipation is a pretty safe diagnosis. This is a disease that should have early expert attention, as it is not a disease that can be neglected with impunity.

BLOAT, another of the intestinal disorders, known also as Hovey, or as Tympanitis, is known by the evident distension of the abdomen and by the drum-like sound upon tapping on the distended region, which is more characteristic of the left side of the animal. Uneasiness and very evident signs of great distress, difficult breathing and nervous trembling are frequent symptoms. If not soon relieved, the sufferer will sink to the ground and death is likely to follow soon after.

THE INFECTIOUS DISEASES of Cattle are of several sorts; but we need consider only three of them here, under the topic of home treatment. Chief, and certainly the most dangerous of these, are the two forms of Anthrax—Symptomatic and Malignant. The first of these, Symptomatic Anthrax, Black Leg or Black Quarter, is due to inoculation with a bacillus and usually attacks calves from three months to two years old. The germ finds its way into the system through an abrasion or wound, often very small and inconspicuous. It is claimed that it may be taken into raw or sore air passages through the inhalation of dust containing the bacilli, or into the digestive tract with food. It is characterized by a puffy swelling, usually on a leg or quarter, or on the rump or shoulder, although the back or neck is sometimes the seat. When firmly pressed the swelling crackles; this is diagnostic. Other symptoms are marked. A desire to be alone; head extended and held low, breathing hurried and gasping, decided stiffness of joints and lameness are symptoms usually preceding the appearance of the swelling.

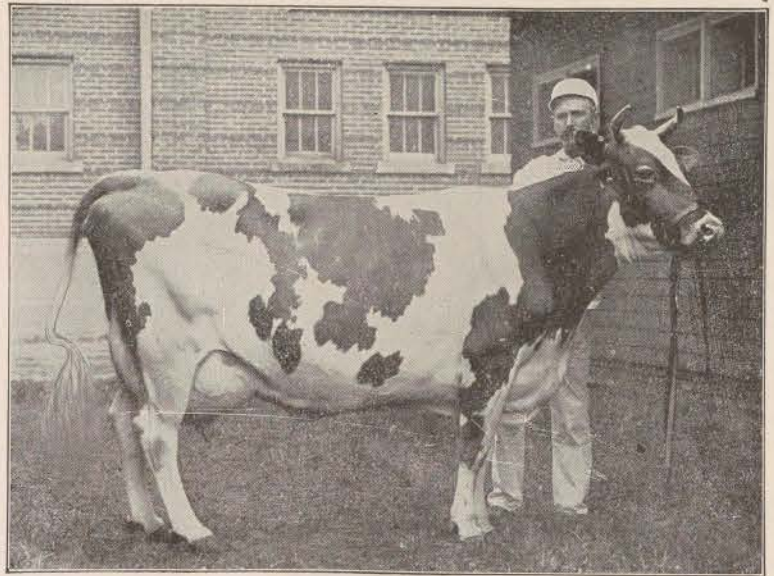
Malignant Anthrax, variously known as Splenic Fever, Malignant Pustule, Charbon, etc., is of all diseases of domestic animals most to be dreaded, especially as it is extremely infectious to all warm-blooded animals and at times suddenly fatal to man. In man it is commonly called Malignant Pustule, though Pulmonary or Intestinal Charbon are also common names. It is the product of infection by the *Bacillus anthracis*, which may be introduced into the system in several ways, through irritation or

abrasion of the skin or mucous membrane, through the digestive tract with food, or by being carried with the bite of a small fly, *Stomoxys calcitrans*, closely allied to our common house fly and greatly dreaded around army hospitals and on fields of battle.

The first symptom is usually a sharp chill or violent rigor, a temperature of 104 degrees to 107 degrees, rushes in one bodily locality and cold elsewhere at the same time, soon to be followed by spasm, profound nervous symptoms, bleeding from the nostrils and in passages from the bowels, often followed by extreme stupor and quick-following death, preceded by abnormally low temperature. As a rule the victim of acute Malignant Pustule dies within one or two days; in subacute they may live for a week. In the latter the sores become gangrenous; a very fair sprinkling of such cases recover. The greatest care must be taken that the animal so infected does not come in contact with others of the herd and is kept from scratching against surfaces accessible to other farm animals, or to humans; or where that is likely to take place, such surfaces are immediately disinfected and kept so. Above all, flies and mosquitoes must be rigorously kept away from any possibility of reaching the sores or any discharges or offal. In case of death—the animal should be burned, or, still better, be buried deep in an ample bed of quicklime. Maxon, in his extensive investigations, proved that an infected carcass, buried in ordinary earth and six feet deep, after eight years was surrounded by animal decay in the loam that contained the living bacilli of Anthrax.

Another infectious disease, though in this case due to a bacterium (a germ of vegetable origin) rather than to a bacillus, is

LUMPY JAW, or Actinomycosis, Big Jaw, Wooden Tongue, and known by other names as well. While usually a disease of cattle, it affects practically all animals, humans as well as others. It usually appears in the head, hence several of its names, and is the product of the presence in the tissues of the ray-fungus bacterium, Actinomyces, found upon various species of fodder-plants, but especially on the grasses. Infected plants if eaten by an animal with abrasions of the mucous membrane in the mouth, carry the germ into the system. Its infection of man has been traced to picking the teeth with a straw or spear of grass from a field where infected cattle had been grazing, and where discharges from their mouths or



GUERNSEY COW, GLENCOE'S BOPEEP

secretes, as this is strongly laxative in its nature. The meconium (contents of the calf's intestines when born) is often retained; this is abnormal and a form of constipation to be dreaded. Warm water well mixed with sweet oil and soap, used as injection, will usually suffice to remove the meconium. Occasionally, two to four spoonful of castor oil, administered internally, may be necessary. One dose should suffice.

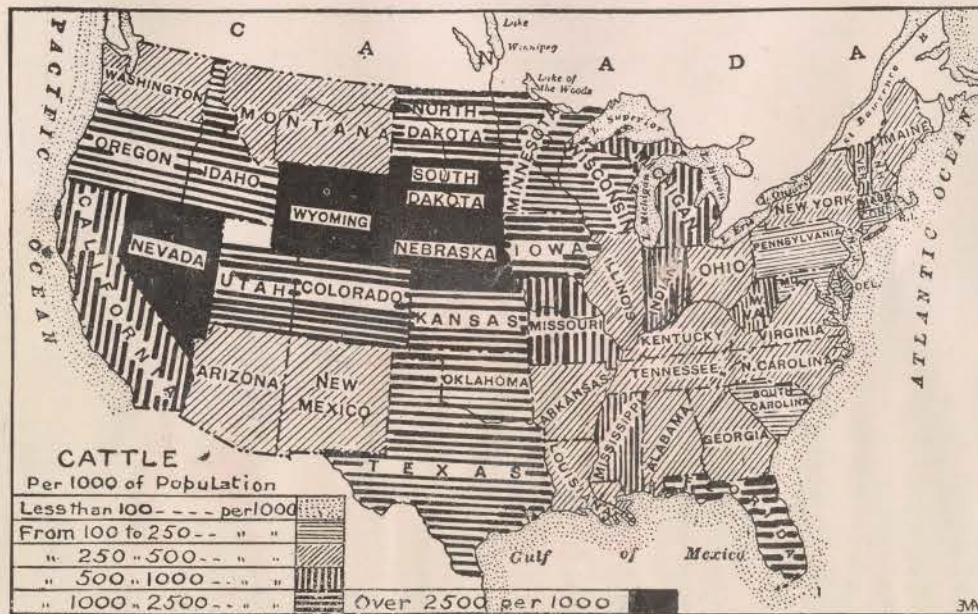
BLOAT, Tympanitis, or Hovey, is a disease, as already indicated, varying in urgency. In the less immediate or threatening cases, it is first important to keep the mouth open for the ready escape of the imprisoned gas and to use some remedy to stop its formation. Take a block of wood, about three-fourth of an inch square and 8 or 10 inches long and place it far back in the mouth like a driving bit, and tie it in place with strings from each end, meeting at the back of the head. Administer ammonia water (hartshorn) in half ounce doses in a quart of water; or, what will probably be more easily obtainable, a quart of milk in which is thoroughly shaken 1½ ounces of turpentine; either of these is intended to stop the formation of the gas; the wooden bit to allow its easy egress.

ANTHRAX, Symptomatic, or Black Leg, is so immediately dangerous that in very many cases there is no hope. Vaccination or preventative inoculation is really the only true hope. The Federal Bureau of Animal Industry at Washington supplies an Anthrax vaccine that is thoroughly reliable and that can be had at a nominal price. Any intelligent breeder can readily follow the directions that accompany it. Many of the State Experiment Stations also supply such a vaccine, and there are several commercial vaccines on the market. They are all administered by hypodermic syringe. Tonics and drugs are usually without any avail; they are poor dependence, at the best. As death usually results quickly, killing the infected animal is most advisable, after which deep burying in quicklime is the only safe method. All places where an infected creature has been must be most thoroughly and copiously disinfected; burning halters, all offal, pails, etc., is most advisable.

ANTHRAX, Malignant, or Splenic Fever, Charbon, or Malignant Pustule, also is a disease of such deadly virulence as to call for the prevention of vaccination and to hold out small hope for curative methods, after the event. See as to vaccines in the above section on Symptomatic Anthrax. The Carbuncular form, a milder form already described, sometimes may be cured by strong antiseptic solutions (such as carbolic acid or bichloride of mercury solutions) applied to the carbuncles, or tumors, freely and constantly. This must be supplemented by other sanitary treatment in every respect. Read the above section as to destruction of the carcass and disinfection of all surroundings and accessories.

LUMPY JAW, Wooden Tongue, Actinomycosis, etc., may often be relieved, if taken very early, by a strong blister made of mercury beniodide and powdered cantharides, in equal parts and thoroughly mixed, rubbed well in with six parts of vaseline or very pure lard, preferably the former. In advanced cases liberation of the pus and the insertion of caustic, such as corrosive sublimate in a capsule, or entire dissection of the diseased area, where that is possible, may result favorably, although none too likely. In that form known as Wooden Tongue, 2 to 4 drachms of potassium iodide may be effective if continued twice daily until iodism is manifested. But this is really only a safe treatment in the hands of the skilled veterinarian.

CAUTION. It should be added and be emphasized here that, in the last three diseases here considered, the aid of the skilled practitioner should be had at the first possible moment; not alone in the interest of the suffering animal, but for the safety of other members of the herd. And too much stress cannot be put on the great importance of thorough disinfection during and after the event. Carelessness in this respect is almost criminal.



intestinal canals had been dropped upon the grass. As the principal name indicates, the most common symptom is a lump on the jaw; although, as indicated by another name, the tongue is often so infected and enlarged as to hang out of the mouth in a most distressing way, the sufferer unable to eat, even breathing made difficult, and a constant dribble of saliva running down. It may, in rare cases, appear in any part of the body and the bones may be implicated seriously. It is a disease much to be dreaded.

THE COMMON ILLS AND INJURIES of the Cow are about the same as those of the Horse and are to be classed, both in symptomatology and treatment, as treated of in the matter pertaining to that animal. Colds, distempers, ordinary intestinal troubles, etc., are to be treated in much the same way. Here it will suffice to describe the best home methods for treatment of those specialized diseases above treated of.

DIARRHOEA, Scours or Dysentery, is a disease calling more for preventive than for curative methods. A clean, well ventilated barn (above all, with plenty of sunshine), where all due attention is given to correct bedding and regularity in feeding, should not harbor the scouring calf.

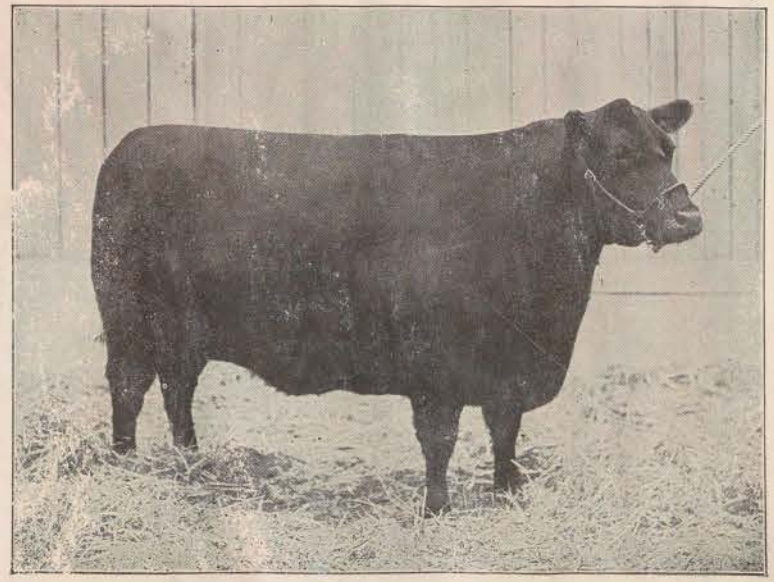
If such an one there be, it should at once be removed and be isolated until cured. Do not allow calves to be crowded in close quarters, and use plenty of lime as a purifier. Reduce the food somewhat, regulate the mother's diet, see that the feeding pails are kept well scalded; a little lime may well be added to the milk fed.

After removing the patient to a point of isolation, which must be clean, warm and dry, a half cup of boiled milk may be given, to which is added two table-spoonful of castor oil. A cow that has been fresh for four or five months gives the best milk for such purpose. Follow this dose with another composed of a drachm each of spirits of camphor, tincture of opium, and dilute sulphuric acid repeat as long as necessary in doses one to two hours apart. If the calf seems very weak, give a raw egg and about two ounces of whiskey beaten up in a pint of milk, as a tonic.

CONSTIPATION, also mainly a disease of calves, is well combated by prevention, this there in the case of the mother, unwholesome food, dry and unappetizing, given to the mother cow, is a fertile cause. Look after her food carefully before birth of the calf, and feed the calf under all circumstances on the first milk she



RED FALLOW COW, DELPHINE

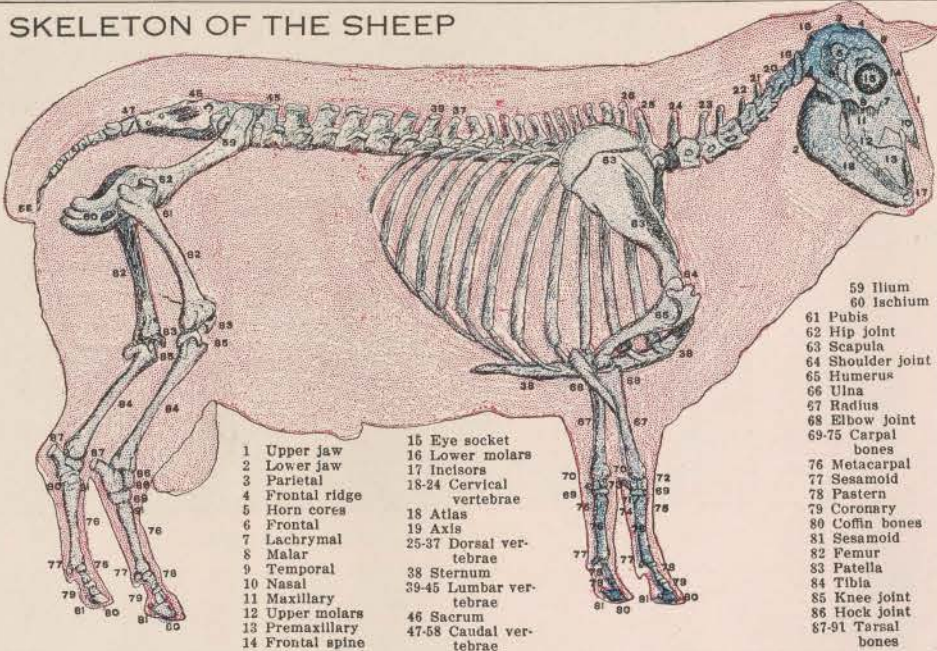


ABERDEEN ANGUS COW, VIOLET 3RD OF CANGASH

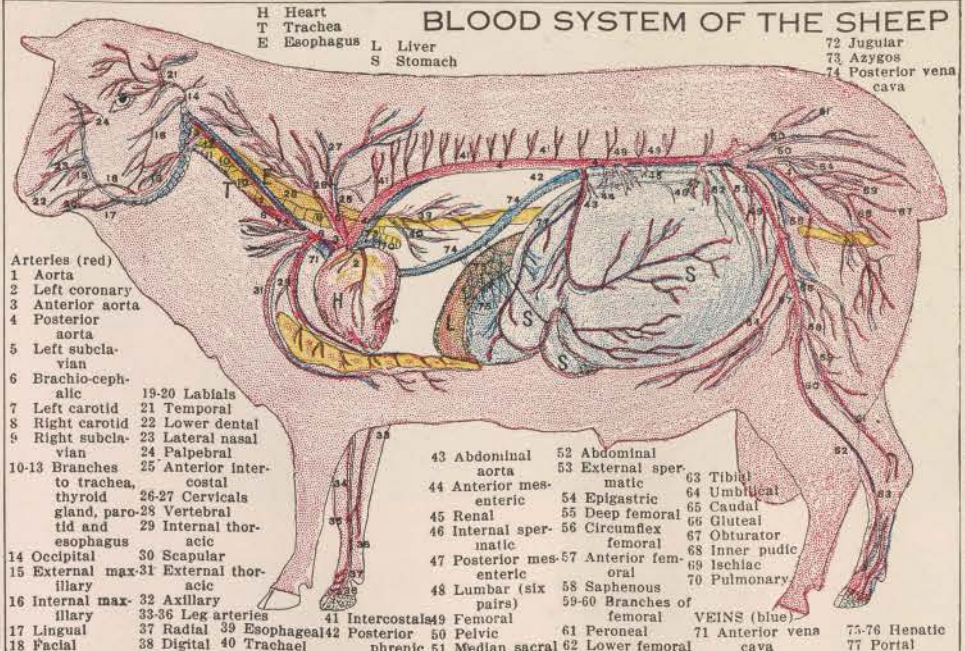
THE SHEEP IN HEALTH AND DISEASE

Physiology and Hygiene of the Sheep

SKELETON OF THE SHEEP



BLOOD SYSTEM OF THE SHEEP



The shepherd and his sheep have been familiar figures from before the dawn of history and, the horse alone excepted, care has been given to improving the breeds of sheep, longer than to any other domestic animal.

In our country the best-known and most-valued breeds are the Merinos, of the fine-wooled class, the Southdowns, Hampshires, Shropshires, Dorsets, Oxford and Cheviots, of the medium-wooled breeds, and Cotswolds, Lincolns, and Leicesters, of the long or coarse-wooled sheep. There are more Merinos raised in the United States than of all other breeds combined; they numbered about 75 per cent. at the last census.

CARE AND FEEDING call for less attention and worry in the sheep than in the case with any other of our domestic animals. None of them can weather the repeated storms and exposure that is possible to most breeds of sheep, the hardiest of which, while on range, partake of the nature and resisting powers of the wild mountain varieties, from which they were originally derived. The sheep does not well stand tendering or any form of life that makes for too great ease of living. Only at the time of the birth of the lamb do they seem to require any special attention in this direction. Uncleanliness in yards or sheds, however, is to be guarded against at all times. Unventilated basement barns or stables warm enough for dairy cows will result in serious losses in the lamb crop.

In food, access to pure water for the sheep and a certain degree of moisture for their pasture, when living out, seems to be all that is required. The sheep is better able to choose his food wisely, when on range, than most of his domestic relatives.

Hoof diseases, lice, scab, wool balls, constipation, caked udder, and garget are diseases that may be classified as those of neglect or carelessness; while stretches, colic, quidders, bloat, and diarrhoea are mainly to be attributed to mistakes or inattention as to their feeding.

Sheep are only excelled by hogs in their ability to produce meat from a given quantity of food, and are superior to them in the utilization of coarse fodders and bulky food, even excelling cattle in this respect. The usual estimate of average is that it calls for 9 to 11 pounds of dry matter to add a pound of weight with steers, while the same will be produced in sheep by 7 to 9 pounds of the same food. And—most important—while the sheep is excelling in this way he will grow a fleece worth from \$1.00 to \$2.00 per head.

GENERAL USEFULNESS. A medium-sized flock of sheep will yield more profits to the farmer, under mixed farming, than any other animal. They are almost omnivorous eaters of weeds, wonderful in their ability to keep a farm clean of them, thriving better on poor pasture than any other animal; and almost equal to goats for destroying underbrush.

GROWING FOR WOOL ALONE cannot be profitably conducted on high-priced agricultural lands, if wool is selling at 25 cents a pound, or less. Under western range condition and in large flocks, where one man can handle from 2,000 to 4,000 sheep, there is a possibility of considerable profit for wool alone; but even there

many growers believe in the greater profits of a general-purpose sheep, which will yield a good fleece and also a good mutton carcass. It seems that the kind of ration, so long as it is sufficiently nutritious, has very little influence on the quality of wool produced. Grain-fed lambs produce a greater gross weight of wool, as a rule; but, after scouring, the amount of washed wool is not greater. Apparently only the "yolk" (the natural grease or oil) in the wool is increased by a grain diet, to no particular profit.

MUTTON SHEEP are raised on an enormous scale on some western ranches, where close herding and feeding is so arranged and systematized that four men can take care of fully 10,000 sheep. In favorable years enormous profits are made on such ranches.

HOTHOUSE LAMBS, probably the most profitable class in the sheep industry, are fat lambs weighing from 40 to 60 pounds, marketed between Christmas and the following April, January and February lambs finding the best markets in our large cities. The chief difficulty is in getting the ewes to breed so that their lambs will be dropped in October to December. For this purpose the Dorset sheep are the most popular. Experiments show them to yield lambs averaging 53.5 pounds when nine weeks old, each having made an average gain of nearly 5 pounds per week.

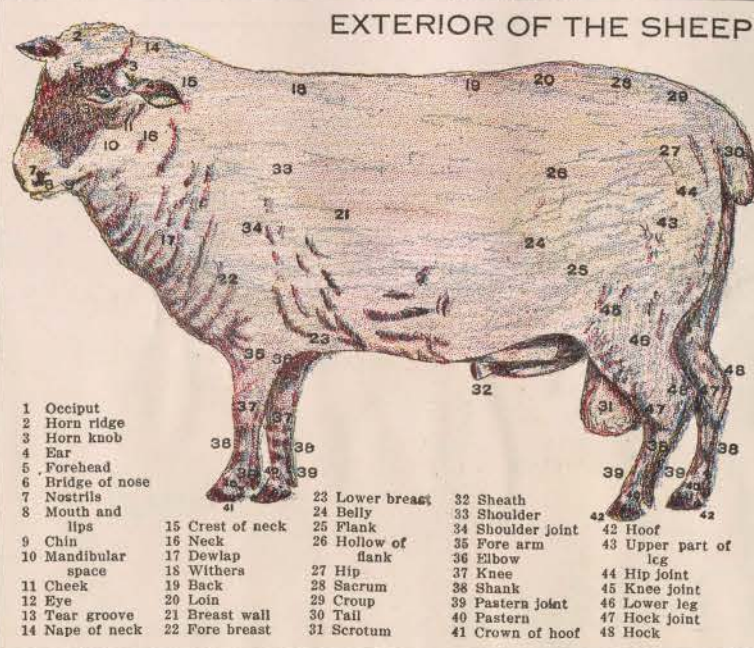
COMMON DISEASES of sheep have among them a number of ailments that respond favorably to home treatment, provided diagnosis is accurately made. Among these the grub worms (gid or sturdy), tapeworms, and the stomach worm, are internal parasites; while scab, ticks (causing wool balls), lice, and anthrax, are external parasites. Scab, a most troublesome visitation, is universal, being found wherever sheep are. It is, in the common acceptance of the term, a contagious disease to be rigorously combatted and stamped out at its very first manifestation. For anthrax there is nothing to be urged but to kill and burn the carcass; it is transmissible to humans.

Colic, diarrhoea, bloat, thrush in the lamb's mouth, and black muzzle, are digestive ailments, due mainly to faulty feeding and are amenable to the ounce of prevention, much more readily than to the pound of cure.

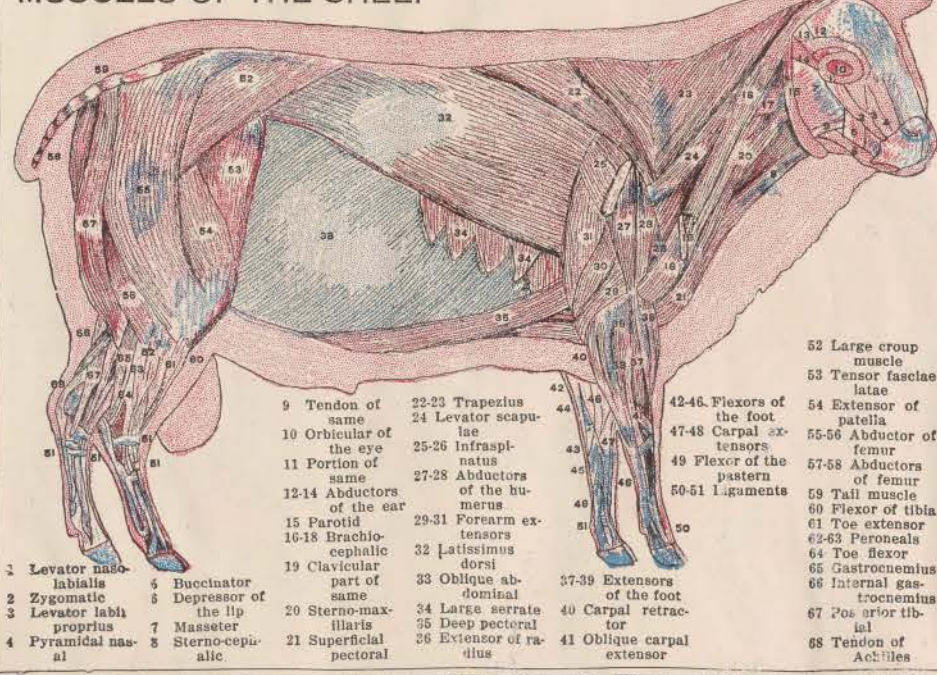
As with all other farm animals, over-dosing and experimentation with "cure-alls" are quite as dangerous as are these diseases in their early stages, and rest and quiet, until a veterinarian arrives, is often the safest plan, unless the grower or some assistant has unusual skill in such matters.

SCAB, technically *Scabies*, in Sheep is not only the commonest disease among them, but probably is the most universal of any of the diseases of our domestic animals. It is due to an external parasite, which uncleanly quarters aid in spreading, and is contagious. The suffering animal scratches, rubs and bites itself unceasingly, until its body soon becomes a mass of sores and their scabby coverings, from which comes the name. It is the product of an itch-insect, *sarcoptes ovis*, relatives of which cause itch in the human and mange in dogs, cats, horses, cattle, etc. The Sheep's side is usually first attacked; thence it spreads rapidly over the entire body. Frequent dipping alone will eradicate it.

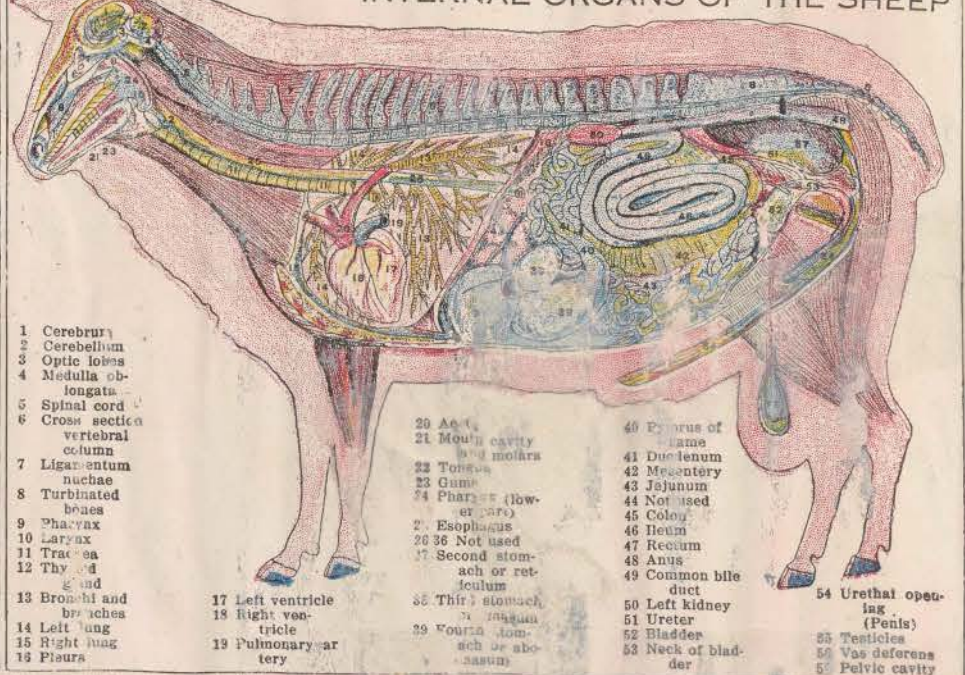
EXTERIOR OF THE SHEEP

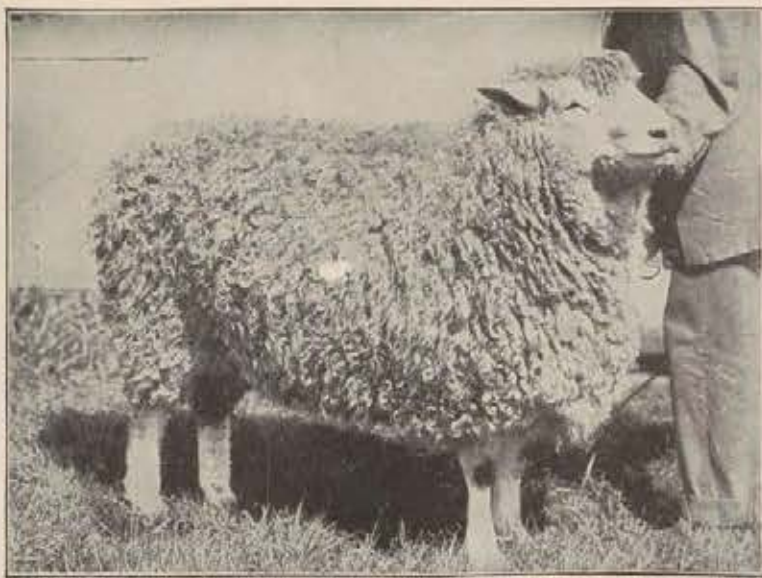


MUSCLES OF THE SHEEP



INTERNAL ORGANS OF THE SHEEP





A Famous Prize Winning LINCOLN RAM

DISEASE SYMPTOMS of the Sheep are not as common as in the other domestic animals; while, perhaps, the sheep is subject to as many different diseases as the other animals, these occur less frequently and it appears to be a sturdier creature than the other farm denizens. In the frequency of their appearance the leading symptoms seem to be those of the

PARASITIC DISEASES. Principal among these are the various Worms, Lice, Scab, Wool Balls, and Anthrax. With the exception of the last named these diseases are more or less amenable to home remedies.

WORMS are of three principal sorts: (1) The Stomach Worm, a thread-like worm, about an inch long, found in the sheep's fourth stomach, most frequently in young lambs. Colicky pains are a chief symptom; (2) the Tapeworm, causing an abnormally great appetite while the flesh continues to waste away; and (3) the Grub Worm, the larva of the gadfly, causing extreme giddiness, from which Gid, the secondary name is derived.

SCAB AND LICE cause much the same symptoms, inordinate scratching and even biting of the infected areas. Scab usually appears first on one side or the other, but quickly spreads over the entire body, if not immediately conquered. It is a contagious disease and is universal. These skin irritations cause the sheep to bite at the infected areas and in that way wool is carried to the stomach—hence **WOOL BALLS.**

ANTHRAX, the immediate and very dangerous nature of which has been thoroughly discussed elsewhere, calls for the early arrival of the veterinarian. It is perhaps as well to anticipate his almost invariable verdict and kill the sheep and thoroughly destroy its carcass. Remember that Anthrax is communicable to man and greatly to be dreaded. Stamp it out!

DIGESTIVE TROUBLES in the sheep are mainly Constipation, Diarrhoea or Scours, Thrush, Bloat, and Colic. The first two of these have been sufficiently discussed elsewhere in these columns. Their symptoms are practically the same as in man.

THRUSH, due to the derangement of the mother's digestive processes, appears in the mouth of the lamb, which refuses to eat and is greatly salivated.

BLOAT is easily diagnosed by the state made plain by the name, the body appearing to be out of all proportion to the legs.

COLIC AND STRETCHES cause the sufferer to lie down. In Colic it grinds its teeth; this is often mistaken at first for the Stretches, which causes the sheep to extend itself, when down, to the greatest possible length. Both have been mistaken for yearning, the pangs of birth. Colic should be diagnosed early and be quickly relieved.

NEGLECT DISEASES may be enumerated as Foot Rot or Foot Scald, Caked Udder, and Inflammation of Eyes. Limping and soreness in the clefts of the feet are the symptoms of Foot Rot; unclean runs and neglect

in foot-trimming are the prime causes. Neglect of the ewe at weaning time causes Caked Udder, whose name sufficiently describes the symptoms of the disease. Related to it is Garget, a knotty congested condition of the Udder, usually due to a cold or chilling. Faulty sight, sometimes resulting in total blindness is caused often by exposure to severe weather, but more frequently is due to a faulty construction or location of the barn.

MINOR DISEASES, so far as frequency is concerned, are Tumors, a manifestation of tuberculosis; Goitre, a swelling of the neck glands, usually deadly; and Urinary derangements, usually in the ram, whose water is stopped, and generally due to an over supply of nitrogenous food. These all should call for the prompt intervention of veterinary skill.

USEFUL HOME TREATMENTS of the foregoing diseases are here described, it being premised that correct diagnosis is of the utmost importance. The wrong diagnosis may call for a remedy utterly unsuited, perhaps radically hurtful, to the true disease. This is always the main danger in home remedies and methods, as should constantly be remembered.

PARASITIC DISEASES, already described, are of two classes, Internal parasites, Worms, and external, the ticks, lice, etc. For the first class, the Worms, santonine is especially to be recommended. In doses of from two to four grains administered on an empty stomach and followed by an active purge, it is usually entirely effective. For the Stomach Worm, the veteches are recommended as a preventative. Flour, honey, and powdered tin in equal quantities, made into a three or four drachm pellet, given on an empty stomach and followed by an active purge, is generally effective with these worms. For the Grub Worm a sovereign remedy is to bore some augur

holes in a log, fill them with salt and cover over with tar; in their eager attempts to obtain the salt, the sheep get the tar on their noses, from whence it is soon transferred to the stomach; tar is a most effective remedy for the grubworm. For Tapeworm, use santonine, as above described, or, also highly praised, let the animal fast for at least 15 hours, a whole day is better; then administer an injection of warm water and quickly follow up with a drachm of oil of male fern in two ounces of castor oil.

SCAB AND LICE. Both of these call urgently for dipping; no other course holds out any real promise of cure. There are a number of excellent proprietary dips on the market. "Kroso" is a highly recommended dip for Lice. For Scab at least three dippings will be necessary and all feed racks, troughs, mangers, stalls, fences, etc., should be most thoroughly disinfected. Intervals of from ten days to two weeks should be between the dippings.

WOOL BALLS, rarely cured, is related in cause to the above, as elsewhere described. Raw linseed oil is sometimes found to be palliative in this trouble.

ANTHRAX or Malignant Pustule, is incurable and is exceedingly communicable, even man being in danger. Kill the animal promptly and burn or destroy with quicklime, burying deeply.

DIGESTIVE TROUBLES nearly all call for the study of dietaries and a change in most instances. In Constipation the root crops and oil cake will prove to be corrective. Soapy injections, or of raw linseed oil, followed by a good dose of castor oil will usually not need to be repeated, if the feed is looked after. In Diarrhoea, on the other hand, the castor oil should precede a dose consisting of one drachm each of powdered ginger and laudanum, mixed thorough-



MERINO RAM, DON ALFONSO, Champion at N. Y. State Fair

ly with twelve drachms of prepared chalk. One dose is usually sufficient; keep sheep for awhile on dry rations of a poor nature.

COLIC AND STRETCHES. The similarity of symptoms in these diseases has already been alluded to. If not very soon relieved colic is apt to lead to severe inflammation and to death. A drop of laudanum with one drachm of powdered ginger, taken in a little flaxseed tea usually produces prompt relief. In the case of Stretches the prevention is the true line of treatment. This can usually be procured by the abundant feeding of roots, which are always to be recommended under all circumstances. For the throes of the attack, however, melted lard, in one-fourth-pound doses, will be found to be a reliable remedy.

TUMORS. The sheep with a decided tumor, tuberculosis, had better be killed and burned.

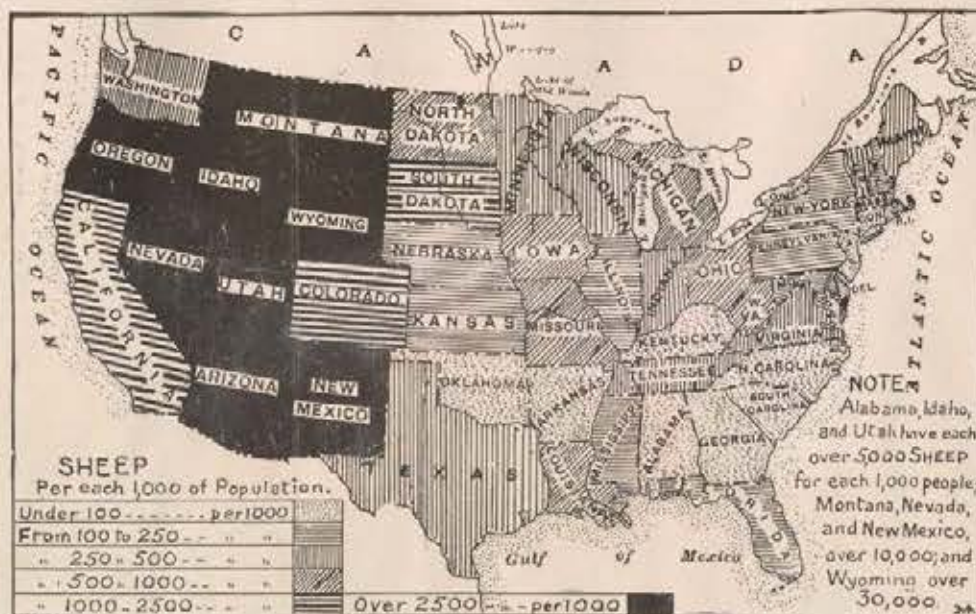
GOITRE. In adults, cut into the growth heroically and, when bleeding stops, inject a small syringe full of tincture of iodine, two-thirds strength. Where Goitre appears in the young lamb it is usually quite incurable and it is best to kill the little sufferer.

CAKED UDDER, Sore Teats and Garget. In Caked Udder the ewe should be sheltered during treatment. Mix turpentine into lard to the consistency of cream and, after bathing the udder in hot water, rub the mixture gently but thoroughly into the inflamed parts. Sore Teats, usually due to the lambs eagerly biting them, can best be relieved by applications, three or four times daily, of equal parts of olive oil and glycerine. Garget should be very promptly relieved. Bathe the udder with hot water in which is dissolved an ounce of baking soda. Then dry the udder with a soft cloth and rub in thoroughly either camphorated oil, or lard and turpentine, as above described.

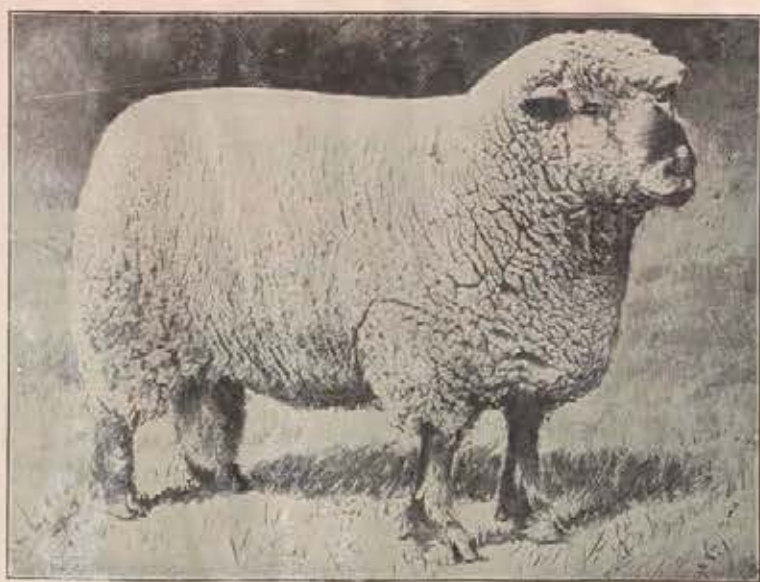
EYE INFLAMMATION calls for immediate and thorough washing of the eye with some good eye lotion, of which your druggist can recommend several. Then, the veterinarian should be sent for, or blindness is quite likely to ensue.

BLOAT should be tapped as early in the trouble as possible. A common knife may be used, but a trocar is better and one should be kept on hand. Whatever the instrument, it should be scrupulously clean and be sterilized by passing several times through a candle's flame. Take care not to strike a kidney; study our plates. After tapping, sterilize the wound with peroxide of hydrogen and cover with adhesive plaster. Then give a heavy dose of raw linseed oil, followed in one hour by a dose consisting of three drachms of hyposulphite of soda and one drachm of powdered ginger, mixed in water.

FOOT ROT, or Scald, should be first treated with the knife; cut away all dead or proud parts; then drive the sufferer slowly through a trough in which is a dilute of carbolic acid, or blue vitriol. Ask an expert as to solution and remember that it is a dangerous compound.



SHROPSHIRE RAM, INGLEADER, a frequent Prize-winner

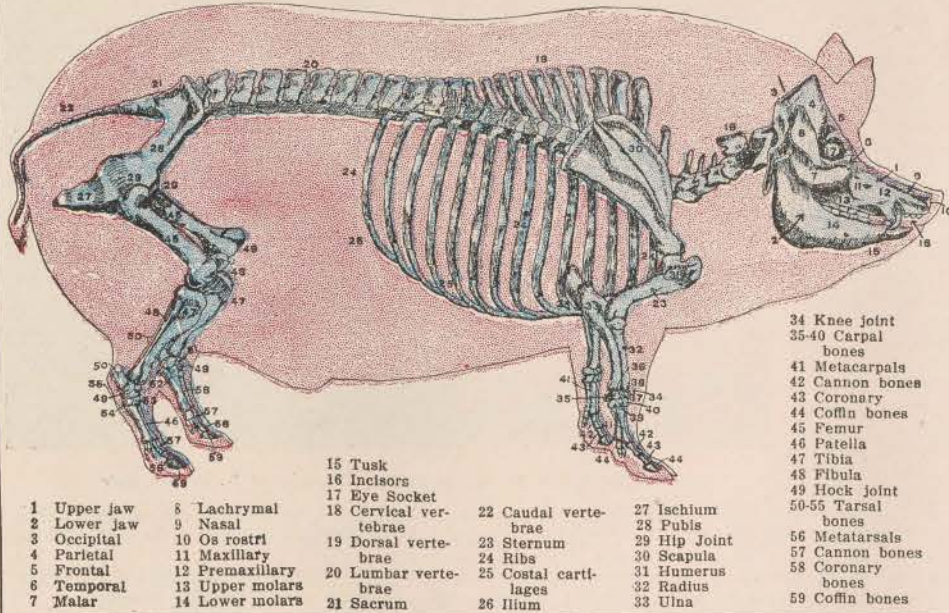


OXFORD RAM, undefeated at many shows

THE HOG IN HEALTH AND DISEASE

Physiology and Hygiene of the Hog

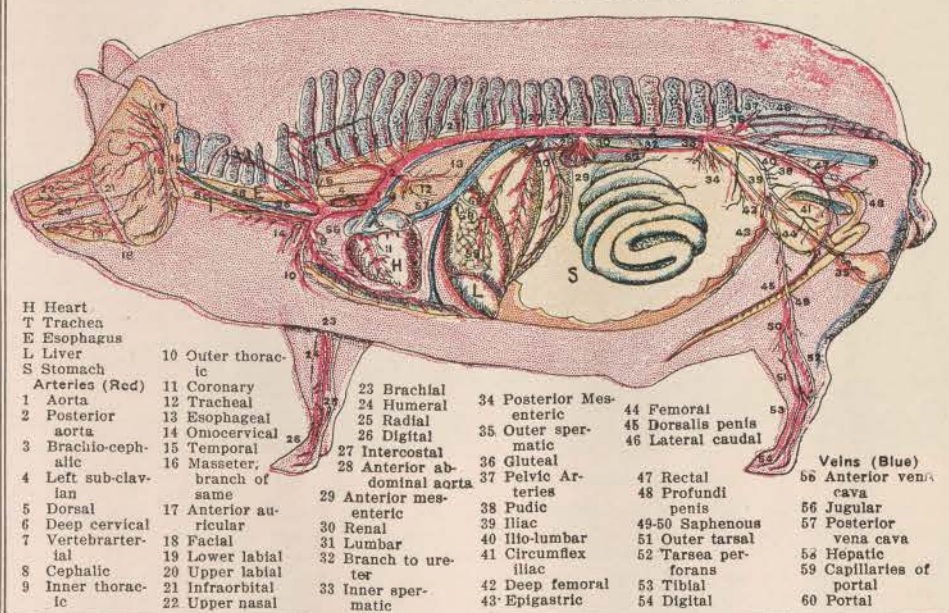
SKELETON OF THE HOG



- | | | | | |
|-------------|-----------------|-----------------------|----------------------|--------------|
| 1 Upper jaw | 8 Lachrymal | 15 Tusk | 22 Caudal vertebrae | 27 Ischium |
| 2 Lower jaw | 9 Nasal | 16 Incisors | 23 Sternum | 28 Pubis |
| 3 Occipital | 10 Os rostri | 17 Eye socket | 24 Ribs | 29 Hip joint |
| 4 Parietal | 11 Maxillary | 18 Cervical vertebrae | 25 Costal cartilages | 30 Scapula |
| 5 Frontal | 12 Premaxillary | 19 Dorsal vertebrae | 26 Ilium | 31 Humerus |
| 6 Temporal | 13 Upper molars | 20 Lumbar vertebrae | 32 Radius | 32 Radius |
| 7 Malar | 14 Lower molars | 21 Sacrum | 33 Ulna | 33 Ulna |

- | | | | | |
|-----------------|--------------------|----------------|-----------------|-------------------|
| 34 Knee joint | 35-40 Carpal bones | 41 Metacarpals | 42 Cannon bones | 43 Coronary |
| 44 Coffin bones | 45 Femur | 46 Patella | 47 Tibia | 48 Fibula |
| 49 Hock joint | 50-55 Tarsal bones | 56 Metatarsals | 57 Cannon bones | 58 Coronary bones |
| 59 Coffin bones | | | | |

BLOOD SYSTEM OF THE HOG



- | | | | | |
|--------------------|-----------------------------------|-----------------------------------|-----------------------------|-----------------------------|
| H Heart | T Trachea | E Esophagus | L Liver | S Stomach |
| Arteries (Red) | 10 Outer thoracic | 11 Coronary | 12 Tracheal | 13 Esophageal |
| 1 Aorta | 14 Omocervical | 15 Temporal | 16 Masseter | 17 Anterior abdominal aorta |
| 2 Posterior aorta | 18 Anterior aortic branch of same | 19 Anterior aortic branch of same | 20 Lower labial | 21 Infraorbital |
| 3 Brachiocephalic | 22 Upper nasal | 23 Brachial | 24 Humeral | 25 Radial |
| 4 Left sub-clavian | 26 Digital | 27 Intercoastal | 28 Anterior abdominal aorta | 29 Anterior mesenteric |
| 5 Dorsal | 30 Renal | 31 Lumbar | 32 Branch to ureter | 33 Inner spermatic |
| 6 Deep cervical | 34 Posterior mesenteric | 35 Outer spermatic | 36 Gluteal | 37 Pelvic Arteries |
| 7 Vertebral | 38 Pudic | 39 Iliac | 40 Ilio-lumbar | 41 Circumflex iliac |
| 8 Cephalic | 42 Deep femoral | 43 Epigastric | 44 Femoral | 45 Dorsalis penis |
| 9 Inner thoracic | 46 Lateral caudal | | | |

- | | | | | |
|-------------------|--------------------------|-----------------------|-----------------|------------------------|
| 47 Rectal | 48 Profundi penis | 49-50 Saphenous | 51 Outer tarsal | 52 Tarsal perforans |
| 53 Tibial | 54 Digital | 55 Anterior vena cava | 56 Jugular | 57 Posterior vena cava |
| 58 Hepatic portal | 59 Capillaries of portal | 60 Portal | | |

Anti-dating the earliest history, friend of man before the first days of hieroglyphs and picture writing, yet the Hog has only seen his great improvement and main development within the past half century. The home of maize, Indian corn, in the Mississippi Valley, where hog-fattening is most economically carried on, is the world's greatest center of the Hog's growth and advancement.

Hogs may be divided into two classes, economically: bacon producers and lard producers. Of the former, Yorkshires and Tamworths are leaders, with sometimes Chester Whites and Berkshires; the Duroc-Jerseys, Poland-Chinas, Suffolks, Cheshires, and Essex as lard producers, with the Chester Whites and Berkshires often in this class also.

The Berkshires, Poland Chinas, Chester Whites, and Duroc-Jerseys are the four most popular breeds in this country; the first of these is of English origin, the others are of American breeding.

SELECTION OF BREEDING STOCK is of utmost importance to the breeder. Says Prof. F. D. Coburn, long famous as Secretary of the Kansas Board of Agriculture: "The burden of excellence should not be placed upon the boar alone, nor solely on the sow, and it is only by a combination of the merits from both parents that the best results are had. The sows should be roomy, broad, and maternal in appearance, while the boar ought to be more compact and well built, yet none the less robust, rugged and masculine. Selection according to type is of greater importance than selection by breed. Type has to do with the constitution, capacity, and general merit of the Hog, and, whatever the breed, there are certain points that make for a good or a poor hog, as they may be found prevailing or lacking." He then indicates the principal of these, as follows:

A short, broad, concave face, wide apart eyes, usually with an upturned muzzle, speaks of a quiet disposition and strong digestive and assimilative powers; in a word, a quick-fattening and profitable animal.

A well-rounded, prominent jowl, with short head, suggests early maturity and quick feeding.

Medium-sized ears, soft and silky, indicate

high quality and light offal; the reverse, with thin skin and coarse hair, call for flabbiness and much offal waste. The erect, foxy, pointed ear, straight face, and sharp, long nose, indicate poor fattening qualities, too much nervousness, and perhaps viciousness.

A wide, deep chest goes with robustness and ample lung room, signifying hardness and great resistance to the pig's many ills.

A slightly arched back, not too long, packed with muscles (lean meat, where the

sprawling feet, results from faulty breeding and too long continued corn diet.

TOO MUCH CORN, the same authority tells us, leads to excess of fat, not only outside the muscles, but among them, causing a lack of development in them, especially along the back. Skin, hair, and blood supply are all abnormally reduced, and the spleen, liver and kidneys are unusually small. Consequently, the bone strength is reduced quite one-half. He says: "A system of feeding which robs the hog of half

animal. It is a long since exploded belief that a hog's natural state is one of unmentionable filth and that anything unclean is good enough to feed him. Sanitary surroundings, a pen capable of quick and thorough cleaning, a balanced ration fitted to the purposes for which he is intended—breeding, bacon or lard production, and plenty of fresh air, but shelter from inclement weather when necessary, are all important contributors to the Hog's rapid, sturdy, and profitable growth.

THE COMMON DISEASES of the Hog are, as in all farm animals, those having their main origin in neglectful housing and surroundings, and in improper food or over-eating. Given fairly hygienic surroundings and a carefully studied ration, the Hog should progress with a fair proportion of success, although it must be admitted that he is the most frail of our farm animals.

HOME TREATMENT, in the absence of the veterinarian, or while he is coming, may be resorted to in a number of ailments, principal among which are: The various Worms, Mange, Scours, or Diarrhoea, Constipation, Thumps (palpitation of the heart), Quinsy, and Inflamed Udder. It is of the greatest importance, however, that the diagnosis be accurate, and too great freedom in experimental dosing should be carefully avoided, as more harm is done by incorrect diagnosis and unwise dosing, than would have resulted in rest and quiet until the expert had arrived.

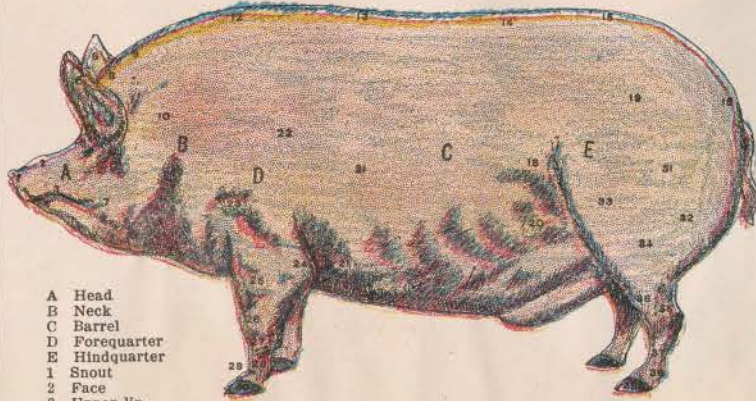
While the Hog is subject to an unusual number of diseases, it is, nevertheless, a disease-resisting animal in that it usually can wait the veterinarian's arrival.

RELATIVE FOOD COST. The authority already quoted gives the following as the relative costs of corn and live weight pork: Corn at 25 to 30 cents a bushel yields pork costing 2½ cents a pound to produce. Corn at 35 to 40 cents a bushel yields pork costing 4 cents a pound to produce. Corn at 50 cents a bushel yields pork costing 5 cents a pound to produce.

On the assumption that the net weight of hogs is 20 per cent (1-5) less than that of the live weight; or the live weight .25 per cent (1-4) more than the net, the following is a fair rule:

To ascertain the net weight multiply the gross weight by .8; to find the gross weight divide by .8.

EXTERIOR OF THE HOG



- | | | | |
|----------------|-------------------|------------------|------------------|
| A Head | 16 Buttocks | 24 Elbow joint | 32 Ham |
| B Neck | 17 Tail | 25 Arm | 33 Knee joint |
| C Barrel | 18 Side | 26 Knee joint | 34 Lower leg |
| D Forequarter | 19 Hip | 27 Shank | 35 Hock |
| E Hindquarter | 20 Belly | 28 Pastern | 36 Hock joint |
| 1 Snout | 21 Ribs | 29 Crown of hoof | 37 Shank |
| 2 Face | 22 Shoulder | 30 Hoof | 38 Pastern joint |
| 3 Upper lip | 23 Shoulder joint | 31 Hip joint | 39 Hoofs |
| 4 Chin | | | |
| 5 Eye | | | |
| 6 Ear | | | |
| 7 Jaw | | | |
| 8 Occiput | | | |
| 9 Nape of neck | | | |
| 10 Neck | | | |
| 11 Throat | | | |
| 12 Withers | | | |
| 13 Back | | | |
| 14 Loin | | | |
| 15 Croup | | | |

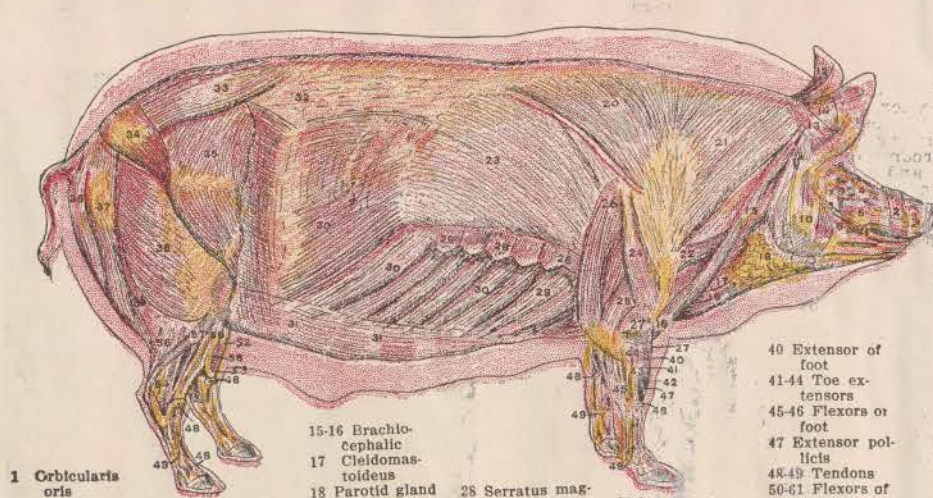
tenderloin is) tells of strength and added weight. If the rump is level, without much slant, the thighs fleshy full and firm, well-spread toward the hocks, a large ham is indicated; an important matter to both grower and butcher. Sides long and deep and an even underline signify good weight, a high-quality of bacon, if not too fat, or ample "sidemeat" if fat.

Short, stocky legs belong to the pig with deep sides and indicate general character and constitution. Weakness in them, with

its blood and half the normal strength of the bones, and produces other violent changes is a most unnatural one and must, if persisted in, end in giving us a race of animals unsatisfactory to all concerned. From parents thus weakened must come descendants that will fall easy victims to disease. Nor is this all; the meat can hardly be of satisfactory composition and flavor."

CARE AND FEEDING are of just as much importance to the Hog as to any farm

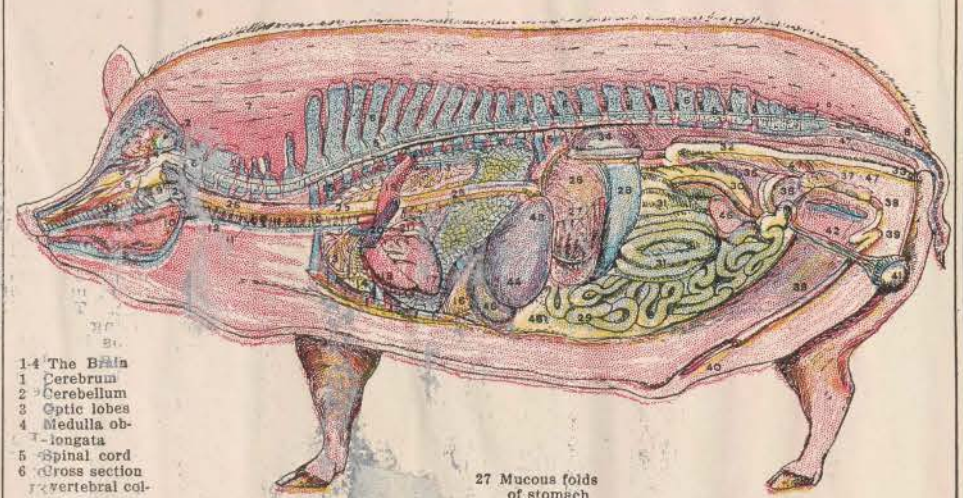
MUSCLES OF THE HOG



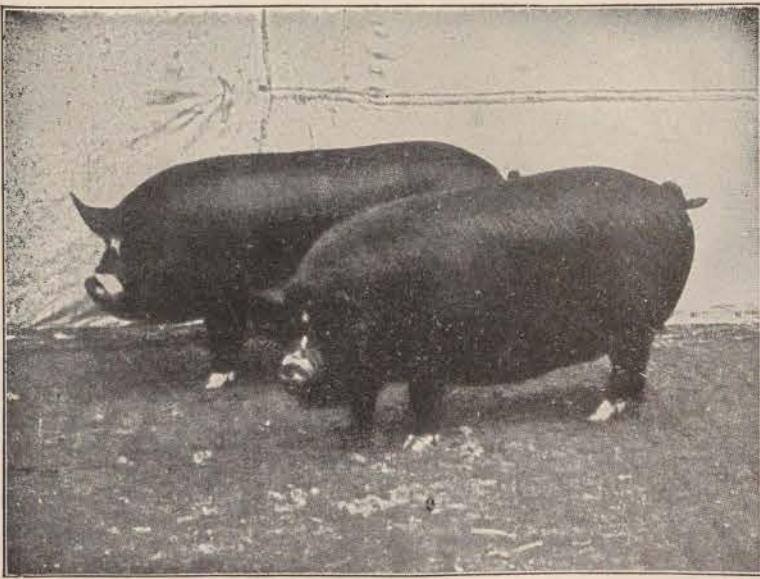
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|--------------------------|---------------------------|-------------------------|----------------------------|------------------------|
| 1 Orbicularis oris | 7 Buccinator | 15-16 Brachio-cephalic | 28 Serratus magnus | 33-34 Gluteals |
| 2 Levator labialis | 8 Orbicularis palpebrarum | 17 Cleidomastoideus | 29 Sternohumeral | 35 Thigh extensor |
| 3 Zygomatic | 9 Buccal | 20-22 Trapezus | 30 Outer oblique abdominal | 36 Semitendinosus |
| 4 Pyramidal | 10 Masseter | 23 Latissimus dorsi | 31 Rectus abdominis | 37 Semimembranosus |
| 5 Depressor of the lip | 11 Parotid | 24 Deltoid | 32 Lumbodorsal fascia | 38 Supradorsal gluteal |
| 6 Levator labii proprius | 12-14 Neck muscles of ear | 25-26 Forearm extensors | | |
| | | 27 Extensor of foot | | |

- | | | | | |
|----------------------------|---------------------|--------------------------|---------------------------|--------------------|
| 40 Extensor of foot | 41-44 Toe extensors | 45-46 Flexors of foot | 47 Extensor pollicis | 48-49 Tendons |
| 50-61 Flexors of foot | 62 Peroneal | 63 Extensor of third toe | 64 Extensor of fourth toe | 65 Flexor medialis |
| 66-68 Muscles of lower leg | | | | |

INTERNAL ORGANS OF THE HOG



- | | | | | |
|----------------------------|-------------------------------------|---------------------|----------------------------|---------------------|
| 14 The Brain | 1 Cerebrum | 2 Cerebellum | 3 Optic lobes | 4 Medulla oblongata |
| 5 Spinal cord | 6 Cross section of vertebral column | 7 Ligamentum nuchae | 13 Bronchi | 14 Right lung |
| 8 Larynx | 9 Pharynx | 10 Larynx | 11 Trachea | 12 Thyroid gland |
| 19 Aorta | 20 Pulmonary artery | 21 Aortic arch | 22 Mouth | 23 Tongue |
| 24 Pharynx | 25 Esophagus | 26 Stomach | 27 Mucous folds of stomach | 28 Spleen |
| 29 Small intestine | 30 Caecum | 31 Colon | 32 Rectum | 33 Anus |
| 34 Left kidney | 35 Ureter | 36 Bladder | 37 Prostate gland | 38 Penis |
| 39 Sigmoid flexure of same | 40 Gland of same | 41 Testicles | 42 Vas deferens | 43 Liver |
| 44 Left lobe of same | 45 Right lobe of same | 46 Abdominal cavity | 47 Pelvic cavity | |



BERKSHIRE PIGS, winners at the Smithfield Show, England

SYMPTOMS OF DISEASES of the Hog, or of such diseases as may safely be left to home treatment, or may be temporarily relieved while the veterinarian is on his way, may be briefly outlined as follows:

INTESTINAL DISEASES are such as Scours, or Diarrhoea, Constipation, Hog Cholera, Swine Plague, and the various worms. The symptoms of Constipation, whether in domestic animals or in man, are too well known to call for enumeration here. Suffice it to say that tight bowels are more apt to afflict the Hog during the winter and that they should be promptly relieved, as they prevent proper feeding, the assimilation of food and, as a consequence, the normal rate of putting on flesh, for which the hog is being raised.

SCOURS, or Diarrhoea, caused most frequently by stale milk or spoiled buttermilk, a damp pen or bed, by changing the pen in such a way that a chill resulted, or from the filth of a wallow, should be promptly stopped. It is very weakening and reduces the Hog to a condition where it is ripe for other diseases. The symptoms, those of loose bowels and thin watery discharges, are too well known to call for enumeration here.

THE WORMS common to the Hog are the Pin Worm, Round Worm, and Thorn-Headed Worm. The first of these is a minute creature, barely $\frac{1}{2}$ inch in length, white in color, the almost microscopic eggs of which are deposited on the grass, and thence, or from running streams into which they are washed, are taken into the Hog's stomach. Itching at the root of the tail is the usual symptom, as they are closely related to the "seat worm" of humans. While not usually serious enough to cause ill health, they cause great annoyance and nervousness and in that way may interfere with nutrition and fattening. The Round Worm, also, is not usually productive of serious consequences, although at times, when present in considerable numbers, it may cause distressing nervous symptoms and even result in fits. Colicky pains, loss of flesh, great restlessness, dry skin with marked loss of hair are prominent symptoms. Morbid appetite is also often to be observed. The Thorn-Headed Worm, on the contrary, because of its size (sometimes reaching 2 feet in length) and great voracity—is the equal of our tape worm, causing its victim to have a voracious appetite, although the addition of flesh seems impossible, great weakness follows, especially in the joints, the eyes become inflamed and are much swollen in the corners. In this state the Hog soon becomes irritable and even, at times, dangerous, because of the nervous strain.

DRENCHING THE HOG is at times necessary and permanent arrangements should be provided so that it can be done promptly whenever called for. Provide a small pen into which the drove, or a part of them, can be driven so that they will be crowded closely together without room for much moving about. Have ready a noose of stout $\frac{1}{4}$ -inch rope (sash cord is good) and engage it around the animal's upper jaw, well back toward the juncture of the lips; then draw it taut, throw back the hog's head and quickly administer the medicine with a syringe. Do not use a glass syringe; use one of metal. In its frantic struggles the animal is apt to break a glass syringe and, swallowing bits of the glass, die from the effects. Where a hog is heavy, strong and unruly, it is well to be provided with a pulley and stretcher, hung conveniently over the pen. With this, by the same noose method, the hog can be elevated almost off its front feet and in that position the most bulky or obnoxious medicine may be administered. Wait until the hog's most frantic efforts have ceased.

UDDER INFLAMMATION, often called Garget, sometimes follows a difficult birth of a large litter; or it may be caused by milk accumulation due to some of the young litter having died. It is also attributed to germ infections, by some. Such inflammation, frequently very observable, should be watched for very carefully and be taken in hand at once.

QUINSY, a form of sore throat, at times a sort of ton-

silitis, is usually characterized by difficult breathing, disinclination to feed, a swollen, hot throat, etc. It is not to be trifled with, as it is often a stepping stone to more serious consequences.

THUMPS is the very characteristic name for palpitation of the heart in the Hog. Said to be due to insuniciency of nitrogen in the food, it is often attributable to too great a ration of corn. The name sufficiently describes the symptoms, the heart's throbbing being very easily perceptible. It should be relieved promptly.

MANGE, another of the diseases of parasitic origin, is too well known in most of the domestic animals to call for description here. Attacking the integrity of the skin, burrowing under it, causing scabs, intense itching and violent scratching, these minute parasites soon produce raw, running sores that almost set the victim frantic. Appetite fails, nervous energy is exhausted, and the victim falls away rapidly. With a magnifying lense of very moderate power the tiny parasites are easily seen; in this way the disease may be instantly separated from eczema, or any like disease.

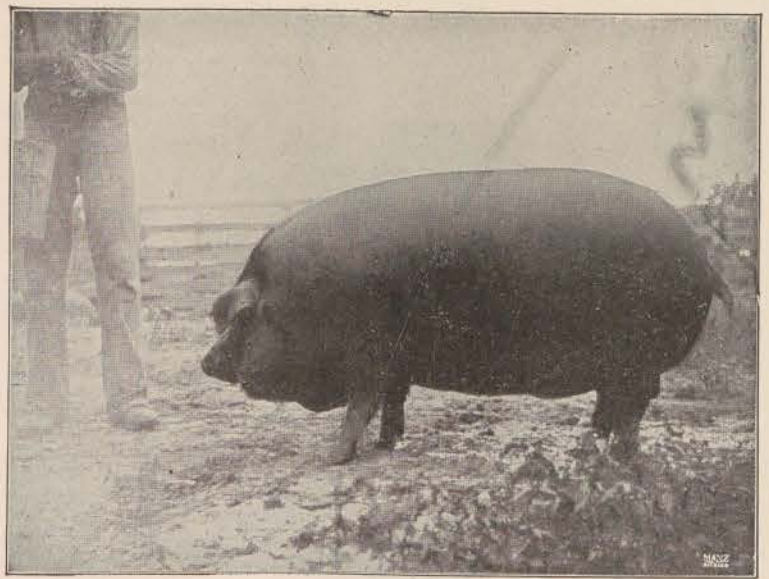
HOG CHOLERA, or Swine Plague, are sometimes only indicated in the first stages by fever,

are at others accompanied by swelling of the tongue and throat. In the postmortem examination button shaped ulcers may be found in the large intestine. Cheese-like collections in the inflamed lungs indicate the probability of Swine Plague being the disease. These are most seriously threatening diseases to be checked and stamped out at once and with the most heroic measures. The veterinarian should be had on the scene at the earliest possible moment.

TUBERCULOSIS in the Hog is closely related in its manifestations to the disease in mankind. Usually it is only detected in the carcass, although at times swellings, notably in the glands of the neck and in the joints, accompanied by a decided diarrhoea, with occasional loss of weight, are to be observed.

SIMPLE HOME REMEDIES for the treatment of the Hog, or for his relief until skilled aid has arrived, here follow another word of warning being first uttered regarding the very great importance of correct diagnosis, before the powerful medicines are administered.

CONSTIPATION may be relieved by almost innumerable remedies; there are many excellent proprietary articles on the market for the purpose. Bran mashers con-



POLAND-CHINA SOW, winner of many State Fair Prizes

an empty stomach. Perhaps santonine, of all the above, is most to be recommended.

HOG CHOLERA, while calling for the veterinarian, may be treated temporarily thus: thoroughly pulverize and mix one ounce each of wood charcoal, sulphur, sodium sulphate and antimony sulphide, with two ounces each of the chloride, bicarbonate, and hyposulphite of sodium. Of this a large tablespoonful should be given for every 200 pounds of the hog's weight, once daily. Once a day give bran and middlings, cornmeal, ground oats, crushed wheat, or other soft feed mixed with hot water, into which the above medicine should be stirred; do not feed corn alone.

TUBERCULOSIS is not curable in swine. Animals should be killed as soon as the diagnosis is made and the carcass should be destroyed effectually.

MANGE can usually be cured by steeping one part of tobacco in twenty parts of boiling water for several hours; clean the affected parts well and then apply this wash with a sponge. Perhaps better is two ounces of stavesacre seed in three pints of water, boil one hour and let steep (nearly boiling) for an hour longer. Rubbed into the sore areas this kills both the parasite and its eggs.

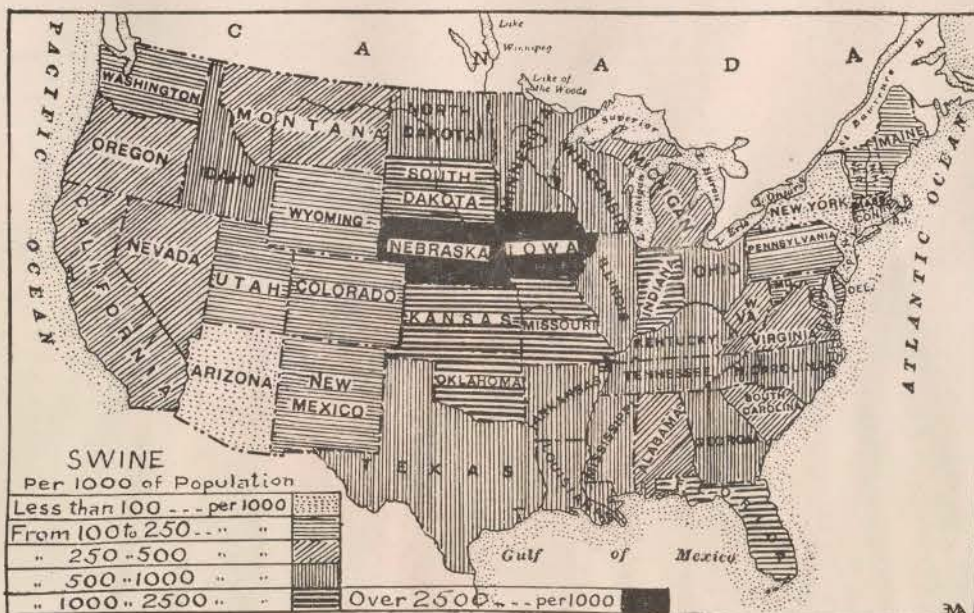
THUMPS, palpitation, is best met by plenty of fresh air and sunshine and a sufficiency of exercise. In the young pigs, the mother's milk-producing ration should be temporarily decreased. Keep the quarters clean.

QUINSY. A $\frac{1}{2}$ drachm of chloride of ammonia in a half pint of water, given twice daily, is an excellent remedy. Give in the drinking water, if the pig will take it; let it have ample cold clean water to drink at all times. Camphorated liniment rubbed into the neck is helpful. Three drops of fluid extract of belladonna with ten grains of chloride of potassium, thrice daily, will relieve difficult breathing.

SORE MOUTH. A form of mouth inflammation, not of any infectious nature, is sometimes observed in pigs, which have been allowed to wallow in very filthy places, and this is especially so if they have been allowed sour and decomposing food. Saliva dripping from the corners of the mouth and the hog champing its teeth, are unmistakable symptoms. There seems to be call for no other treatment than consists in reforming the food supply, which should be of the most cleanly nature, together with an abundance of pure water.

LOSS OF APPETITE. Hogs are usually known to be very ravenous feeders; but they sometimes lose appetite because of the long-continued use of the same ration without sufficient variety. Thus, corn without other grain occasionally becomes very distasteful to them, and they refuse to eat it. This can almost invariably be remedied by a change of diet and the feeding of a ration of very considerable variety and frequent changes. Sometimes a tonic (milk and egg with a little whiskey) is desirable.

POISONING. A common form of poisoning in hogs that are raised near a city or town, is due to feeding swill from hotels or large boarding houses, where the dishes are washed with washing powder, or some highly alkaline, irritating soap. The leading symptoms are fever, diarrhoea, occasional vomiting and even partial paralysis. In this the rate of mortality is high, and not infrequently the trouble is mistaken for hog cholera. Investigation should be had at once. There are also several plants poisonous to hogs; however, illness from this source is comparatively rare, although hogs are commonly thought to be omnivorous feeders, exercising little care in the selection of their food. Cottonseed meal, if fed in large quantities and for long periods has also resulted in serious poisoning. The young cocklebur is known at times to have a poisonous effect. It is doubtful whether there is any actual poisonous principle in the plant; the irritation is thought to be from eating the young burrs. In all such cases of poisoning, the hog should be drenched, a tonic administered and it should be kept a few days in a clean pen and fed most carefully on the best of food and be amply supplied with the purest of water.



taining sulphur, or some one of the laxative salts, are favored by many. An injection of warm soapsuds is excellent in stubborn cases; soft soap may be given with the feed, though some hogs will refuse food so treated. It is, however, far better to study the diet and alter the food accordingly, thus aiming at the cause and not at the symptom. Apples, most of the root crops, and pumpkins are as a rule sufficiently corrective and will bring the creature back to its normal condition of easy and frequent passages.

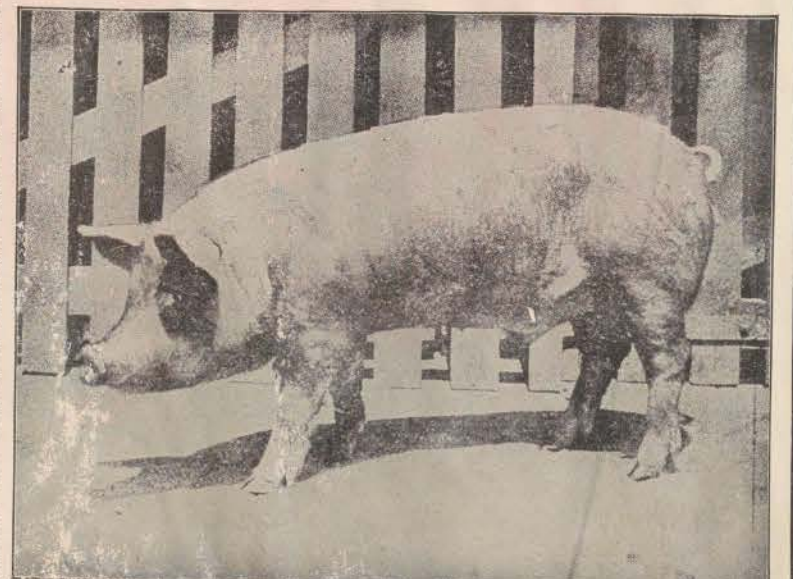
DIARRHOEA, or Scours, calls for immediate attention, especially where it appears among the young pigs. Dry quarters are a first essential; at any rate the litter should at once be moved from the present pen. Sulphur, in daily doses of a tablespoonful to each sow, kept up for three to five days is favored by many. White oak bark tea, very strong and given in pint doses twice daily in the slop is also excellent; so is, also, several slabs of black walnut bark soaked in the swill barrel for ten to twelve hours. If necessary, repeat these treatments in three or four days; diarrhoea should be promptly stamped out.

WORMS. Although usually eating in the most ravenous fashion the hog attacked by worms remains thin and scrawny, and is usually weak and feverish. In case of the latter, quinine in two to four grain doses, should be given three times daily. Weakness may be overcome by a stimulant of whiskey and eggs, or cod liver oil in place of the eggs. As a rule, however, removal of the worms will have a sufficiently stimulating effect. For the Pin Worm, or seat worm, injections of quite warm water, followed by an infusion of quassia is excellent. The latter is made by infusing two ounces of quassia chips in a pint of boiling water, using it as an injection when cool. A good strong purge, such as below described will often aid in effecting some of these worms.

For both the Round Worm and the Thorn-Headed Worm a powerful purge is needed. An excellent one consists of a half cance of fluid extract of sassafras and senna at a dose, continued every four hours until purging results. Santonine is an excellent and powerful vermifuge; administer it in pill, of four grains each. Wormseed oil (chenopodium) is very highly esteemed by some, in from twenty to thirty drops in syrup; each of these remedies should be followed in two hours by a strong purge, as above, and all should be administered on



TAMWORTH SOW, KATY BELL, Iowa State College

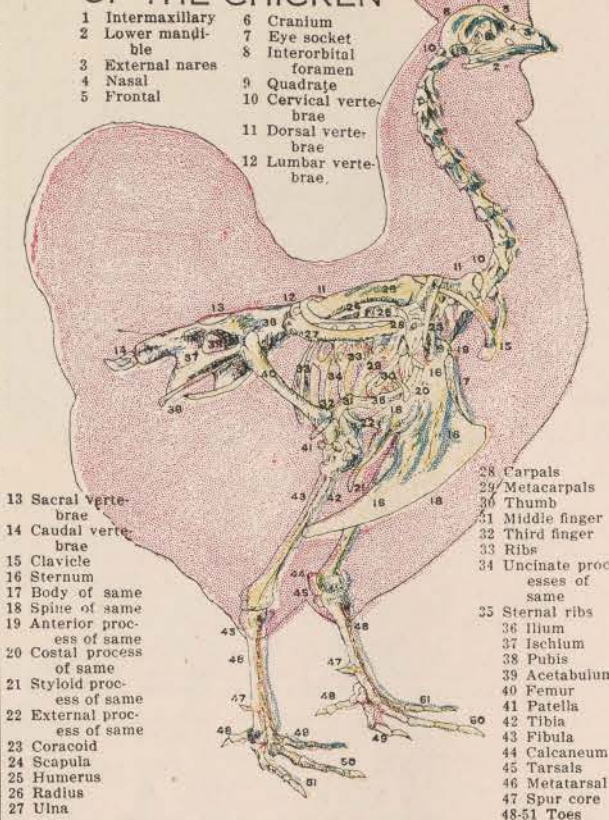


Packer Ideal Model of a Bacon Hog

THE CHICKEN IN HEALTH AND DISEASE

Physiology and Hygiene of the Chicken

SKELETON OF THE CHICKEN



the general farm, as a contribution to the housewife's pin money, it spells absolute failure for the intending chicken farmer. But, of egg or broiler raising for the general market too much can hardly be said in praise of the possible profits, if deliberation, patience, tirelessness, and good, sound, common sense be prominent ingredients of the attempt.

THREE CLASSES of chickens are usually recognized: (1) the purely "egg-machine" sorts; (2) the meat-producing varieties, and (3) the general purpose kinds.

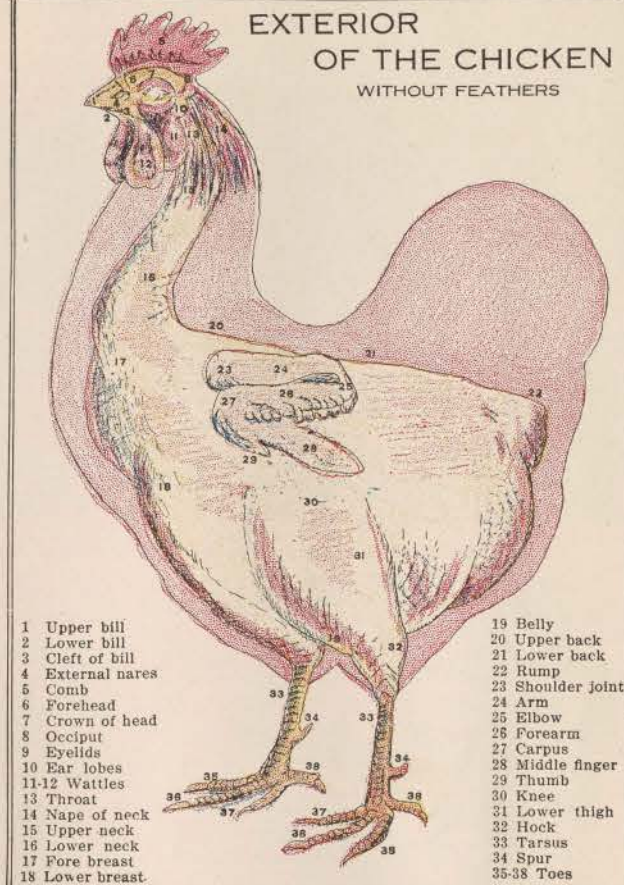
First among the EGG-PRODUCERS come the Leghorns—white, brown and buff; closely following them are the Black Minorcas, while the Blue Andalusians and Spangled Hamburgs, not so well known, are highly esteemed by their owners.

THE MEAT PRODUCING breeds, larger and more sluggish fowls, usually broody and not great egg layers, are Light Brahmas, Cochins, and Black Langshans. The Orpingtons, especially the buffs, and the Plymouth Rocks, mainly the barred, are also famed in this class, though better classed with the following.

GENERAL PURPOSE FOWLS, usually most in demand for the small chicken farm, comprise the following, ranked here according to their apparent present popularity; the Plymouth Rocks, barred, white and buff; the Orpingtons, buff, black, and white; Rhode Island Reds, and Wyandottes, white silver and partridge. For many years the Barred Plymouth Rocks have led in popularity as general purpose fowls, of late the Buff Orpingtons have come into widespread favor, and the Rhode Island Reds for about a decade have claimed a prominent position of these the Orpingtons are the largest; while the Plymouth Rocks are probably the best layers of this class.

THE EGG FARMER, confining himself to that branch of poultry raising, will beyond doubt do best to select White Leghorns, the typical "egg-machine"

EXTERIOR OF THE CHICKEN WITHOUT FEATHERS

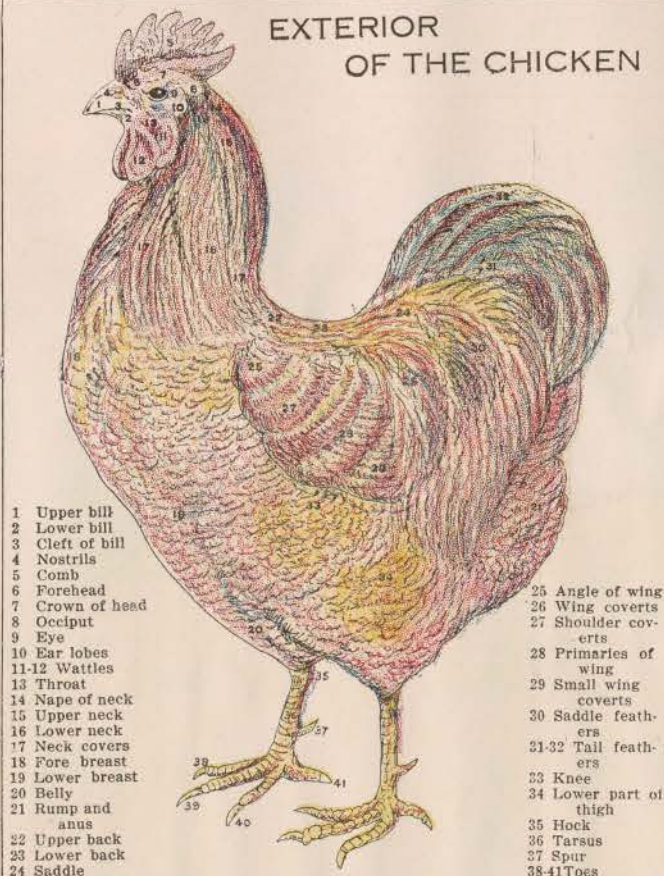


There are very few indeed who realize the cash-producing worth of the Great American Hen. How many are there who know that the value of our gold, or silver, or copper, vast products of which we so proudly boast, pale into insignificance when compared to the value of our annual egg crop. On almost every farm some chickens are kept, and there the yield from them is almost entirely clear profit, usually the share of the farm wife and, coming in small values at a time, regarded by the farmer as almost a negligible item. Yet this negligible item yields, in eggs alone, the vast average sum of over \$315,000,000 per year.

THE PROFITS from poultry raising are undoubtedly the greatest of any of the live stock industries on the farm. An ordinary farm will support from fifty to one hundred hens without taxing its resources, the small cost, on the farm, of what will be needed to feed them, in addition to what they will pick up, will not exceed in value that of the enrichment for garden purposes that they will yield.

SIX CLASSES of poultry raising are now common in this country, the fifth here mentioned being of comparatively recent origin. They are: (1) The production of "broilers" and other chickens for table use; (2) producing eggs for the market; (3) breeding fancy poultry for sale as such; (4) producing eggs for hatching the foregoing; (5) hatching "day-old chicks" for immediate sale; and (6) the well-known, long-prevalent method of hit-or-miss growing of poultry, without thought of breeds or best conditions and results, most common on our farms. The third, fourth and fifth of these classes are not usually profitable; requiring unusual skill and long experience, they most frequently result in failure. The sixth, "hit-or-miss" plan may be dismissed with the single statement that, while quite permissible on

EXTERIOR OF THE CHICKEN



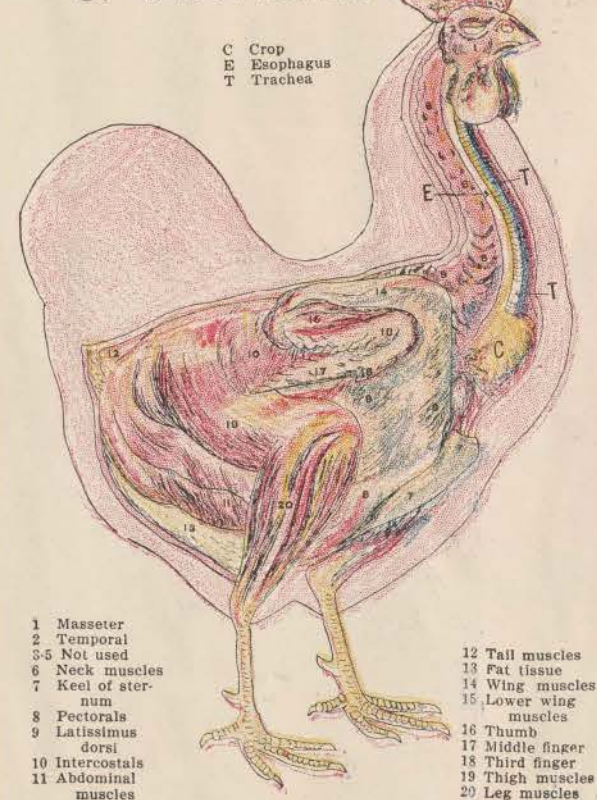
weather, by ample windows, as well as the prevention of too great heat, by awnings or shelters, in summer. It is well to have ample shade, preferably by shrubbery, in or around the runway or pen; lilacs and the large black currants are excellent for this purpose.

Frequent whitewashing, with some one of the commercial disinfectants or insect killers mixed in with it, is very essential to poultry well being. A house clean from offal, food scraps and decaying litter is an absolute essential; this and the prevention of annoyance from rats and mice are best procured by a concrete floor.

While fowls do best on range and can there be more cheaply raised, two pens, or runways are almost as good, and for two reasons: (1) for cleanliness; (2) for a change of scene or feeding ground. As soon as turned out of a run, dig up thoroughly and plant quickgrowing grains and lettuce, beets or chard greens. When these are fairly up in tender green turn the chickens in and repeat the treatment in the other yard, just abandoned. A litter of dry leaves, chopped hay or straw, should be provided into which to scatter their food—so that they may have to scratch or work for their living—a very essential item in their health.

POULTRY FOOD should replace that of their wild or range life as nearly as possible; hence it should contain (1) a grain feed; (2) a green feed; (3) bone and grit; and (4) a meat feed. The ordinary commercial feeds are too apt to abound in corn, have insufficient grit, and of course they do not contain the necessary meat, bone and green ingredients. An ideal feed is one-third of wheat, one-third of cracked corn, one-sixth of oats and one-sixth of kafir corn, cane seed being occasionally substituted for the kafir and the corn being slightly increased in very cold weather. Fresh, pure water is also a prime necessity.

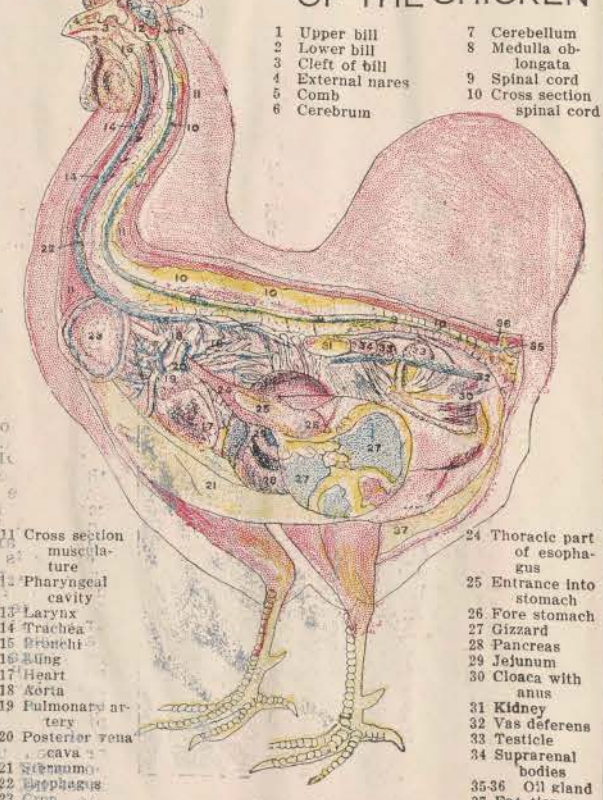
MUSCLES OF THE CHICKEN



par excellence. But, they do not set, incubators or other breeds of hens are needed to hatch the eggs, and their flesh is less tender and juicy, becoming tough earlier than in most breeds. As profitable egg-producing ends at about the fourth year with most hens, when the great egg layers are tough, thin and scrawny, most general farmers and chicken raisers as well, will prefer the general purpose fowls, as above mentioned.

SHELTER AND CARE. In common with all worthwhile domestic animals, the better breeds of chickens are probably somewhat more delicate than their common, or barnyard cousins, and call for greater care in housing and health-maintaining conditions. At any rate, they so require, if they are to be maintained at the highest level of profitable productivity. The style and location of the hen house is of the utmost importance. Dampness must always be avoided; a dry slope, facing south is ideal. Let the house be closed to the north, east and west, made practically air-tight and absolutely stormproof on those sides and above; building paper lining will do this satisfactorily. No part of it should be so low that a man cannot stand upright in it; a stooping man naturally hastens work and cleaning in such quarters is apt to be shirked. A shed roof, say 8 feet high in front (south) and fully 6 feet in the back, covered with good roofing paper or composition, is the proper thing. Do not tender the hens; while moderate warmth and absolute dryness are more requisite for laying hens than food, still it is possible to over-tender the hens and thus subject them to sudden colds. A large railroad lantern hung low will afford ample heat, during cold, damp nights for a house sheltering 50 hens. See that it does not smoke and is the kind that goes out, if tipped over. Sunlight must be provided for, especially in cool

INTERNAL ORGANS OF THE CHICKEN





SINGLE COMB WHITE LEGHORNS

COMMON DISEASES OF Chickens. As with most farm animals the chicken raiser must study prevention of disease, if he wants to attain to the higher levels of success. The causes of the most prevalent diseases of poultry divide themselves into four classes: (1) dirt diseases, (2) those of faulty feeding, (3) exposure diseases and (4) parasitic infestations. Under the first of these, the

DIRT DISEASES are those of uncleanly houses, filthy roosts, and rotting matter in the runs. Chief among these are Limber Neck and Sorehead, although Scaly Leg, Lice and Mites may also be so classified for such parasites have their origin, or early stages, in the filth and droppings to be found in unclean houses.

LIMBER NECK has very marked symptoms, the chief of which is perfectly described by the name. It is generally attributed to eating decayed meat or other animal matter that has been left to rot on the feeding floor or on the ground of the run. The fowl's head droops over to one side and the neck appears to be without strength to hold the head upright.

SOREHEAD, in this disease there are present on the face, comb and wattles minute sores, tiny pustules, the result of filthy quarters, it is believed. The disease is sometimes called Canker, when the sores extend to the mouth and throat.

FAULTY FEEDING, food that is either impure or decaying from unclean surroundings, will cause the following: Cholera or Diarrhoea, other Rowl Troubles and Weak Legs. Each of these is a disease that should be prevented by a little care and foresight.

CHOLERA, or Diarrhoea, a most threatening and contagious disease, is characterized by the greenish, frothy droppings; it is often mistaken for other diseases, not so serious, but any diarrhoea-like trouble should be cared for at once and be carefully watched, as, if it proves to be cholera, it cannot be taken in hand too soon. Being highly contagious, it spreads rapidly and surely and must be combated vigorously, if one does not want to lose a large part of the flock.

WEAK LEGS, caused by too rapid overgrowth of the body of the chicken at the expense of the legs, and common among the young birds, attacking cockerels more frequently than pullets, leads to their sitting on their hocks or, if standing, trembling on their legs very perceptibly. Do not mistake this for rheumatism, in which

the joints of the legs will always be found swollen.

EXPOSURE DISEASES of the common sort are as follows: Roup, Cackles, and Gapes. Of these the first is by far the most dreaded among all the diseases of poultry. To be exact, however, the Gapes are to be classified with parasitic group of diseases.

ROUP, although the most deadly of the diseases of poultry, is not very well understood. It has been ascribed, by various writers, to every form of exposure, subjection to faulty food, etc. It usually starts like a cold and is, in fact, a malady very closely allied to catarrh in man, although far more virulent in nature and effect. The nasal and eye discharges are copious and very apparent cheesy masses collect in the throat and mouth, difficult of removal, and death is apt to follow soon. Damp quarters, draughts overhead, crowding into coops on the ground, where liable to be chilled by the damp earth, yet overheated by the crowding, are fertile causes of the roup. Coughing, sneezing, heavy breathing accompanied by wheezing sounds, swollen heads, and the almost constant water drinking characteristic of fever, are prominent early symptoms of the disease. As it advances, the head swells, usually on one side, frequently obstructing the eyesight, the droppings become diarrhoea-like, and the symptoms partake somewhat of those of cholera.

In the advanced stages of Roup the hatchet is the only safe remedy; there is no cure. Killing and deep burying should be carried out at once. No temporary relief is safe; the spread of Roup is too rapid throughout the flock to permit of any but the most immediate and drastic action.

CACKLES is the name for a species of cold in the throat that produces a rattling when the breath is inspired and expired. Like all other forms of colds in poultry it should have immediate attention as it is never certain when a cold may suddenly develop into Roup.

PARASITIC DISEASES in Chickens are of two classes: (1) exterior, of the skin and feathers, as mites and lice, and (2) interior, as in Gapes.

LICE AND MITES are dreaded enemies, especially among the small chicks. By their parasitic drainage of the strength of the fowls they contribute largely to the various diseases, causing anemia and gen-

LIMBER NECK calls first for the removal of all decaying animal substances from the houses or runs; see that every nook is scrupulously clean. In addition to the permanganate of potash in their drinking water, give ailing birds a little copperas in their water and a few drops of turpentine in the food.

SOREHEAD AND CANKER. Birds suffering with these should at once be removed to an isolation pen. Wash with carbolic acid soapsuds and apply vaseline to the external sores. Peroxide of hydrogen, one-third dilution, is also an excellent wash. Remove internal ulcers with a quill or pointed stick and apply burnt alum to all cankerous spots. Swab the throat with salt water or listerine.

CHOLERA, OR DIARRHOEA. First place the fowls affected in a perfectly dry and moderately warm house; reduce the food supply, giving a little oatmeal boiled in milk and small doses of coal oil; one teaspoonful to each two quarts of meal or mash is a good proportion. The "Douglas Cholera Cure" is a standard and very favorite remedy. It is made thus, according to *The Michigan Farmer*: Water one gallon, copperas a half pound, sulphuric acid one gill ($\frac{1}{2}$ fluid ounce). Give a teaspoonful to a quart of water, or mix it with the soft food.

WEAK LEGS. A pill composed of one grain of sulphate of iron, five grains of sulphate of lime, and one grain of quinine, taken two or three times daily will usually effect a cure. If not so, after ten days, then the hatchet.

ROUP. Sufficient has here been said as to seriousness, contagiousness, and usual incurability of Roup. Let us here emphasize this and urge that the advanced case should surely be killed; and that all fowls dead from this disease should at once be burned thoroughly. At the very best and with the utmost care the loss in the flock, once Roup has fairly started, will be fully 25 per cent. Beyond all things, quickly isolate any suspected bird and keep it separate until all danger of Roup is passed. To each pint of drinking water add a teaspoonful of tincture of chloride of iron. Dust the throat with sulphur thrice daily. In case of inflamed head wash it with warm water and apply a little carbolic acid vaseline to the face and nostrils, avoiding the eyes. If this does not relieve very soon, then the fowls should be killed and burned.



SILVER LACED WYANDOTTES

duces far more eggs per year, and in every way proves to be a good investment, doubling the profit possible on the scrub fowl.

WINTER EGG PRODUCTION. This most desirable result—an abundance of eggs in winter—is partly a question of warmth, but more especially one of variety of food and a fair ration of green provender. No matter how carefully a hen is housed and fed, she will not lay during very cold weather, unless kept free from severe chilling.

SOME FOOD HINTS. Don't feed too much corn; hens will not lay if fed exclusively on corn, for it is excessively fattening and fat hens are too indolent to lay. The morning feed—7:00 a. m. is the proper hour—should be a decidedly mixed ration, varied from day to day, but as an average consisting of oats, wheat, barley and buckwheat, as much as they will clean up. Scatter it in the litter of the feeding floor, to induce them to scratch for it, for the exercise of working for their food is an essential of their wellbeing, especially in winter. At noon feed a little wheat or oats and at five o'clock in the afternoon give a full feed of corn; corn, being heating is especially an evening meal for the winter time, aiding in maintaining the bodily heat. Two or three times a week, vary the above morning meal by giving a mash of ground corn, oats, bran and buckwheat, to which is added a dash of salt. Prepare this the previous night. Stir until thoroughly mixed, cover with boiling water and let it stand all night. It will be cool in the morning. Don't ever feed hot food, it deranges their digestion and makes them tender. Nor sloppy food, which causes indigestion and frequently produces diarrhoea; both are fatal to egg-laying.

GREEN FOOD. During the winter, especially during the snows and times of freeze-ups, a liberal amount of green food should be fed to laying hens. Cabbage, cut clover, beets, etc., are an ideal mixture. Ground green bone is also a famous egg-feeding ration; it most admirably takes the necessary place of the bugs and worms, etc., so freely picked up in the warm seasons. Do not by any means forget to keep an abundance of pure, fresh water and lime and grit always before them. In the line of green food nothing equals sprouted oats for winter feeding. Chicken supply houses keep artificial sprouters and one of these is about the best possible investment for the poultry raiser and egg producer.



eral loss of tone. As soon as any fowl shows itself to be ailing the safe thing is first to search for such infestation. The principal symptoms are continued picking at or under the feathers, rolling and wallowing in the dust, and the signs of a great annoyance around and under the wings, and at the root of the tail or under it.

GAPES, as the name implies, is characterized by continued gaping, accompanied by sneezing and coughing. It is caused by a long, thread-like worm in the windpipe, and is a disease of young chickens.

SCALY LEGS is a disease caused by a small parasite, only to be seen under a microscope. It works under the scales or skin of the legs and soon gets them into a very bad condition. The source of this parasite is believed to be from letting the birds roost in unsanitary, rarely cleaned houses. In time the legs become much swollen and cause such annoyance that fattening and egg-laying are brought to a stop.

HOME REMEDIES are, as a rule, all sufficient in the case of fowls. Only in case of very fancy and valuable breeding stock, blue-ribbon prize winners, for example, is it ever worth while to go to the expense of the skilled practitioner. In difficult or puzzling cases, especially where malignancy or contagion is threatened, it is best to quickly resort to the all-curing hatchet. This is especially so in Roup and in Cholera, as already pointed out.

THE FOWL DISEASES are especially those where the ounce of prevention should be most constantly availed of to save the far more than pound of cure that will be called for. In fact, more than in any other farm creatures, prevention is the keynote as the close way in which they are kept and flocked renders the spread of contagion extremely easy. One of the best preventative measures possible, one that is hygienic and valuable in many cases, is that of using permanganate of potash in the drinking water. But as much of it as will lay on the point of a knife into a gallon of water, enough to color it a rich red; neither pink nor purple. Let them have all they will drink of it about every third day, or every three times a week. It is a powerful disinfectant and germicide and most helpful in warding off colds, roup, etc.

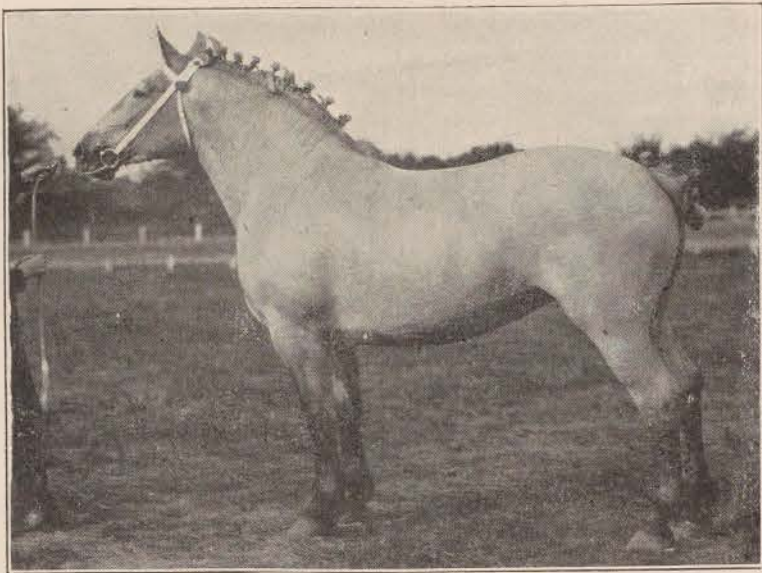


BARRLED PLYMOUTH ROCKS

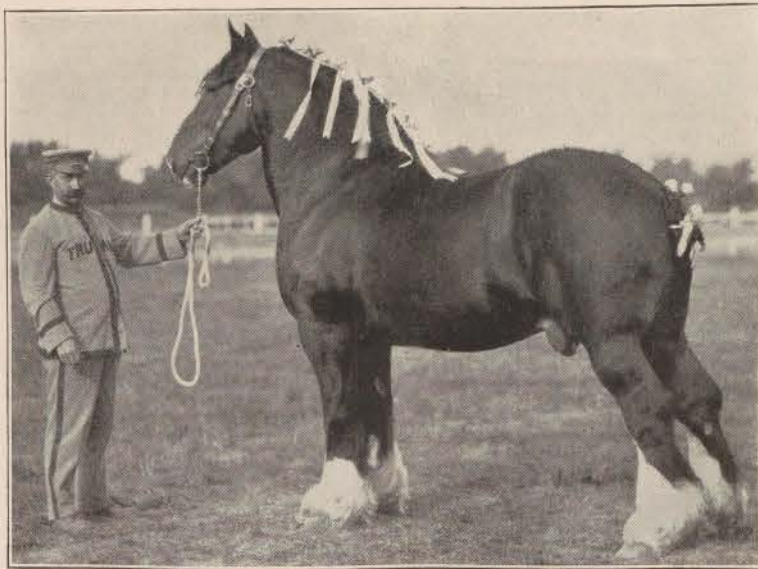


BLACK MINORCAS

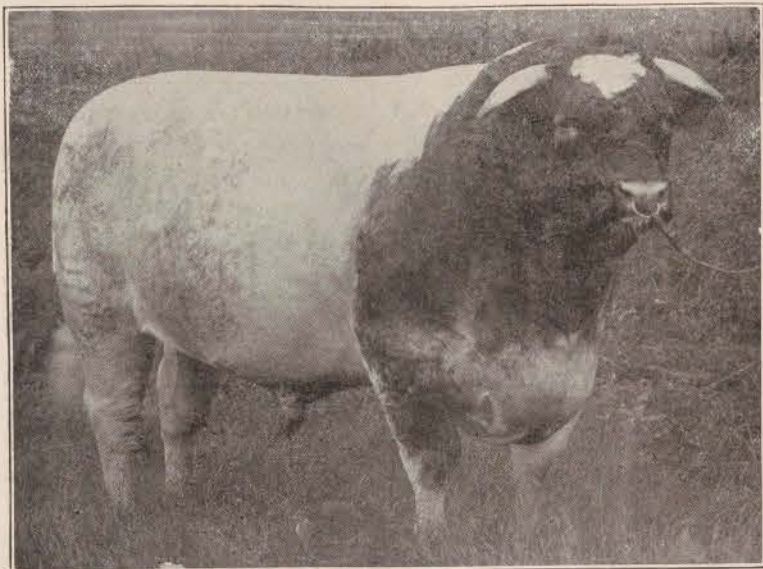
GRAND CHAMPIONS



BEDELIA, CHAMPION PERCHERON MARE, ILLINOIS STATE FAIR, 1916.



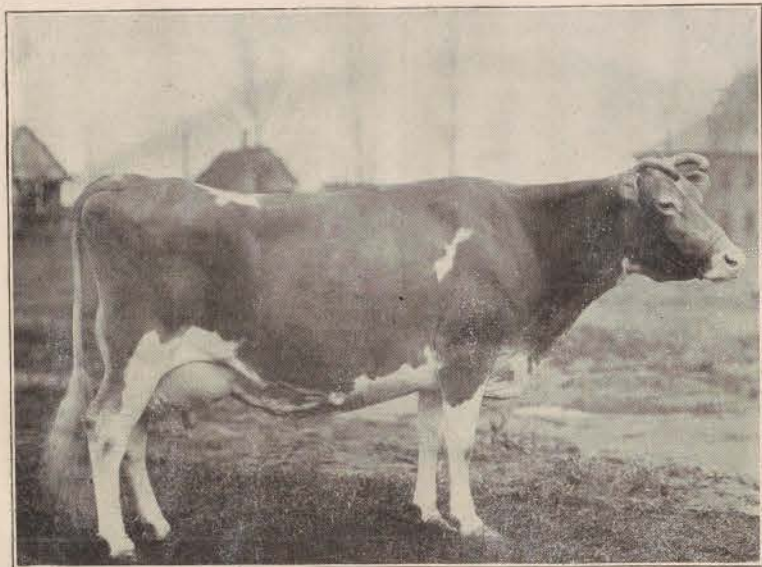
DOVECOTE ROYAL WILLIAM, CHAMPION SHIRE STALLION, ILLINOIS STATE FAIR, 1916.



MAXWALTON REVOLUTION, GRAND CHAMPION SHORTHORN MISSOURI STATE FAIR, 1916.



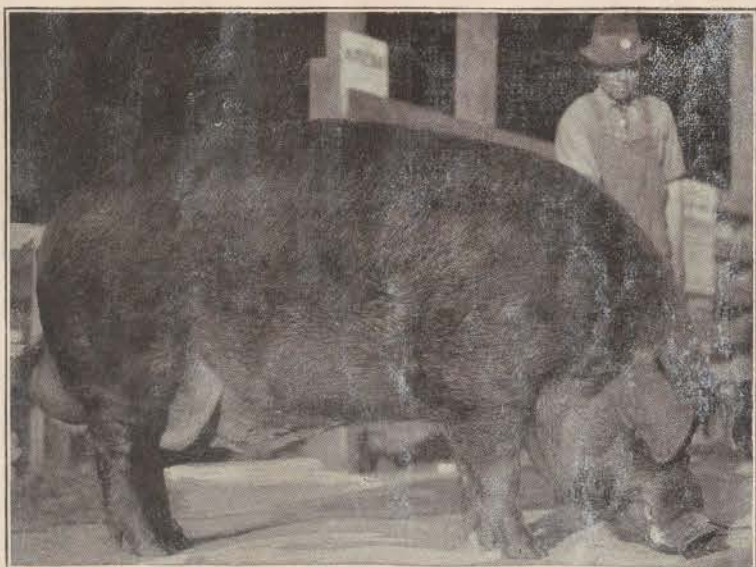
CARNOT, GRAND CHAMPION PERCHERON STALLION IN FRANCE AND INTERNATIONAL LIVE STOCK EXPOSITION, CHICAGO.



PRINCESS BERGERE, GRAND CHAMPION GUERNSEY COW, NATIONAL DAIRY SHOW, 1916.



OAK DE KOL OLLIE HOMESTEAD, GRAND CHAMPION HOLSTEIN BULL NATIONAL DAIRY SHOW, 1916.



ORION CHERRY KING, JR., GRAND CHAMPION DUROC JERSEY, NATIONAL SWINE SHOW, 1916.



WILLIAM A., GRAND CHAMPION CHESTER WHITE AT NATIONAL SWINE SHOW, 1916.

JUDGING POINTS of LEADING FARM ANIMALS

SCALE OF POINTS FOR DRAFT HORSES —GELDING

WEIGHT 4	Over 1,500 pounds.
FORM 4	Broad, massive; Proportioned.
QUALITY 4	Bone smooth; Tendons lean. Hair fine.
TEMPERAMENT 4	Energetic; Good disposition.
HEAD 1	Lean, medium size.
MUZZLE 1	Fine; nostrils large; Lips thin, even.
EYES 1	Full, bright, clear.
FOREHEAD 1	Broad, full.
EARS 1	Medium size; Well carried.
NECK 1	Well muscled; Crest high; Throatlatch fine; Windpipe large.
SHOULDER 2	Sloping, smooth, snug.
ARM 1	Short, thrown back.
FORE ARM 2	Heavily muscled; Long, wide.
KNEES 2	Wide, clean cut; Straight, deep.
CANNONS 2	Short, lean, wide; Sinews large.
FETLOCKS 1	Wide, straight, strong.
PASTERNS 3	Sloping, lengthy, strong.
FEET 8	Large, even size; Horn dense; Sole concave; Bars strong; Frog large, elastic; Heel wide.
LEGS 4	A perpendicular line from point of shoulder should fall upon center of knee and foot.
BODY.	
CHEST 2	Deep, wide, low; Large girth.
RIBS 2	Long, close, sprung.
BACK 2	Straight, short, broad.
LOINS 2	Wide, short, thick; Straight.
UNDERLINE 1	Plank low.
HIPS 2	Smooth, wide.
CROUP 2	Wide, muscular.
TAIL 1	Attached high; Well carried.
THIGHS 2	Muscular.
QUARTERS 2	Deep, heavily muscled.
GASKIN OR LOWER THIGHS 2	Wide, muscled.
ROCKS 8	Clean cut; Wide, straight.
CANNONS 2	Short, wide; Sinews large.
FETLOCKS 1	Wide, straight, strong.
PASTERNS 2	Sloping, strong, lengthy.
FEET 6	Large, even size; Horn dense; Sole concave; Bars strong; Frog large, elastic; Heel wide, one-half length of toe and vertical to ground.
HIND LEGS 4	A perpendicular line from point of buttock should fall upon center of hock and foot.
ACTION.	
WALK 6	Smooth, quick; Long, balanced.
TROT 4	Rapid, straight, regular.
Total 100	
SCALE OF POINTS FOR LIGHT HORSES —GELDING	
FORM 4	Symmetrical; Smooth, stylish.
QUALITY 4	Bone clean, firm; Tendons defined; Hair fine.
TEMPERAMENT 4	Active.
HEAD 1	Lean, straight.

MUZZLE 1	Fine; Teeth sound.
EYES 1	Full, bright.
FOREHEAD 1	Broad, full.
EARS 1	Medium size, pointed. Well carried.
NECK 1	Well muscled; Crest high; Throatlatch fine; Windpipe large.
SHOULDER 2	Long, smooth.
ARMS 1	Short; Thrown forward.
FORE ARMS 2	Muscle, long, wide.
KNEES 2	Clean, wide, straight.
CANNONS 2	Short, wide; Sinews large.
FETLOCKS 1	Wide, straight.
PASTERNS 3	Strong.
FEET 6	Medium size; Horn dense; Frog large; Bars strong; Sole concave; Heel wide.
LEGS 4	Perpendicular line from point of shoulder should fall upon center of the knee and foot.
WITHERS 1	Muscle, well finished.
CHEST 2	Deep, low, large girth.
RIBS 2	Long, sprung.
BACK 2	Straight, short; Broad, muscled.
LOIN 2	Wide, short, thick.
UNDERLINE 1	Long; Flank let down.
HIPS 2	Smooth, wide, level.
CROUP 2	Long, wide, muscular.
TAIL 1	Attached high; Well carried.
THIGHS 2	Long, muscular; Spread, open angled.
QUARTERS 2	Heavily muscled, deep.
LOWER THIGHS 2	Long, wide, muscular.
HOCKS 5	Clearly defined; Wide, straight.
CANNONS 2	Short, wide; Sinews, large.
FETLOCKS 1	Wide, straight.
PASTERNS 2	Strong, sloping.
FEET 4	Medium, even size; Straight; horn dense; Frog large, elastic; Bars strong; Sole concave; Heel wide, high.
HIND LEGS 4	A perpendicular line from point of buttock, should fall upon center of hock, and foot.
ACTION	
WALK 5	Elastic, quick balanced.
TROT 15	Rapid, straight; Regular, high.
TOTAL 100	

SCALE OF POINTS FOR THE COW

FORM 6	Inclined to be wedge-shaped.
QUALITY 6	Hair fine, soft; Skin loose; Medium thickness; Bone clean, fine.
TEMPERAMENT 6	Nervous.
MUZZLE 1	Clean cut; Mouth large; Nostrils large.
EYES 1	Large, bright; Full, mild.
FACE 1	Lean, long; Quiet expression.
FOREHEAD 1	Broad.
EARS 1	Medium size; Yellow inside; Fine texture.
HORNS 1	Fine texture, waxy.
NECK 1	Fine, medium length; Throat clean.
WITHERS 1	Lean, thin.
SHOULDER 2	Light, oblique.
FRONT LEGS 2	Straight, short; Shank fine.
CHEST 10	Deep, low, girth large.
BARREL 10	Ribs broad, long; Large stomach.
BACK 2	Lean, straight; Open-jointed.
LOIN 2	Broad.
NAVEL 2	Large.
HIPS 2	Far apart, level.
RUMP 2	Long, wide.
PIN BONES OR THURLES 1	High, wide apart.
TAIL 1	Long, slip.
THIGHS 4	Thin, long.
ESCUTCHEON 2	Spreading over thighs Large thigh ovals.
UDDER 20	Long, attached high and full behind, extending far in front and full, flexible.
TEATS 5	Large, evenly placed.
MAMMARY VEINS 5	Large and numerous mid veins.
LEGS 2	Straight; shank fine.
Total 100	

SCALE OF POINTS FOR MUTTON SHEEP —WETHER

WEIGHT 8	Score according to age.
FORM 10	Long, level, deep, broad; Low set, stylish.
QUALITY 10	Clean bone, silky hair; Fine skin; Large percentage of meat.
CONDITION 10	Deep, even covering of firm flesh, especially in region of valuable cuts. Points indicating condition or ripeness are thick dock, back thinly covered with flesh, thick neck, full purse, full low flank, plump breast.
MUZZLE 1	Fine, mouth large; Lips thin.
EYES 1	Large, clear, placid.
FACE 1	Short; Clean cut features.
FOREHEAD 1	Broad, full.
EARS 1	Fine, erect.
NECK 1	Thick, short.
FORE SHOULDER VEIN 1	Full.
SHOULDER 1	Covered with flesh; Compact on top; Smooth.
BRISKET 1	Projecting forward; Breast wide.
FORE LEGS 1	Straight, short; Wide apart; Strong.

BODY.

CHEST 8	Wide, deep, full.
BACK 10	Broad, straight, long; Wide, thickly fleshed; Ribs arched.
LOIN 10	Thick, broad, long.
HIPS 2	Far apart, level, smooth.
RUMP 3	Long, level; Wide to tail head.
THIGHS 3	Full, deep, wide.
TWIST 3	Plump, deep.
HIND LEGS 1	Straight, short, strong; Shank smooth, fine.
WOOL.	
KIND 1	Domestic, territory; Carpet or blanket.
CLASS 1	Clothing; Delaine or combing.
GRADE 1	Fine, medium or coarse.
QUANTITY 4	Long, dense, even.
QUALITY 4	Fine, pure; Crimp close; Regular, even.
CONDITION 4	Bright, sound, clean; Soft, light.
Total 100	

SCALE OF POINTS FOR FINE WOOLED SHEEP

FORM 8	Level, deep, stylish.
QUALITY 4	Clean, fine bone; Silky hair; fine skin.
MUZZLE 1	Fine; Broad wrinkly nose; Pure white.
EYES 1	Large, clear, placid.
FACE 1	Thin, wrinkly; Covered with soft, velvety coat.
FOREHEAD 1	Broad, full.
EARS 1	Set, thick, velvety.
NECK 1	Short, muscular; Well set on shoulders.
SHOULDER 4	Strong; Being deep and broad.
BRISKET 1	Projecting forward; Slim.
FRONT LEGS 2	Straight short; Wide apart.

CHEST 10	Deep, full; Indicating constitution.
BACK 4	Level, long; Round-ribbed.
LOIN 4	Wide, level.
FLANK 2	Low, making underline straight.
HIPS 2	Far apart; Level, smooth.
RUMP 4	Long, level, wide.
HIND LEGS 2	Straight, short, strong; Shank smooth, fine.
QUANTITY OF WOOL 15	Long, dense; Even covering.
QUALITY OF WOOL 15	Fine fiber, crimp close; Regular; Even quality, including tops of folds.
CONDITION OF WOOL 15	Bright, lustrous, sound; Pure, soft; With even surface to fleece.
Total 100	

SCALE OF POINTS FOR FAT HOGS— BARROW

WEIGHT 6	Score according to age.
FORM 10	Deep, broad, low, long; Symmetrical, compact; Standing squarely on legs.
QUALITY 10	Hair silky; skin fine; Bone fine; Flesh smooth.
CONDITION 10	Deep; Even covering of flesh.
SNOUT 1	Medium length; Not coarse.
EYES 1	Full, mild, bright.
FACE 1	Short, cheeks full.
EARS 1	Fine, medium size, soft.
JOWL 1	Strong, neat, broad.
NECK 1	Thick, medium length.
SHOULDER 6	Broad, deep, full; Compact on top.
BREAST 2	Advanced, wide.
LEGS 2	Straight, short, strong; Bone clean.
CHEST 2	Deep, broad, large girth.
SIDES 6	Deep, lengthy, full; Ribs close and well sprung.
BACK 10	Broad, straight; Thickly and evenly fleshed.
LOIN 10	Wide, thick, straight.
BELLY 10	Straight, even.
HIPS 2	Wide apart, smooth.
RUMP 2	Long, wide; Evenly fleshed, straight.
HAM 10	Heavily fleshed, plump; Full, deep, wide.
THIGHS 2	Fleshed close to hocks.
HIND LEGS 2	Straight, short, strong; Bone clean.
Total 100	

SCALE OF POINTS FOR BACON HOGS— BARROW

WEIGHT 6	Should be 170 to 200 lbs.
FORM 10	Long, level; Smooth, deep.
QUALITY 10	Hair fine; skin thin; Bone fine.
CONDITION 10	Deep, uniform covering of flesh, especially around valuable cuts.
SNOUT 1	Fine.
EYES 1	Full, mild, bright.
FACE 1	Full, mild, bright.
EARS 1	Trim, medium size.

JOWL 1	Light, trim.
NECK 1	Medium length, light.
SHOULDER 6	Free from roughness; Smooth, compact.
BREAST 2	Moderately wide, full.
LEGS 2	Straight, short, strong; Bone clean; Feet medium size.
CHEST 4	Deep, full girth.
BACK 8	Medium and uniform in width, smooth.
SIDES 10	Long, smooth; Level from shoulders to end of hind quarters.
RIBS 2	Deep.
BELLY 10	Trim, firm, thick.
HIPS 2	Smooth, wide; Proportionate to rest of body.
RUMP 2	Long, even, straight; Rounded toward tail.
GAMMON 8	Firm, rounded; Tapering.
HIND LEGS 2	Straight, short, strong; Feet medium size.
Total 100	

SCALE OF POINTS FOR LEGHORNS, SPANISH & ANCONAS

SYMMETRY 4	
SIZE 4	
CONDITION 4	
COMB 10	
HEAD 6	Shape 2, color 4.
EYES 4	Shape 2, color 2.
BEAK 4	Shape 2, color 2.
WATTLES AND EAR LOBES 10	Shape 4, color 6.
NECK 7	Shape 3, color 4.
WINGS 8	Shape 4, color 4.
BACK 9	Shape 5, color 4.
TAIL 10	Shape 6, color 4.
BREAST 9	Shape 5, color 4.
BODY AND FLUFF 5	Shape 3, color 2.
LEGS AND TOES 6	Shape 3, color 3.
Total 100	

SCALE OF POINTS FOR HAMBURGS

SYMMETRY 4	
SIZE 4	
CONDITION 4	
COMB 10	
HEAD 4	Shape 2, color 2.
BEAK 4	Shape 2, color 2.
EYES 4	Shape 2, color 2.
WATTLES AND EAR LOBES 10	Shape 5, color 5.
NECK 7	Shape 5, color 2.
WINGS 10	Shape 4, color 6.
BACK 8	Shape 4, color 4.
TAIL 12	Shape 4, color 3.
BREAST 9	Shape 4, color 5.
BODY AND FLUFF 6	Shape 3, color 2.
LEGS AND TOES 4	Shape 2, color 2.
Total 100	

SCALE OF POINTS FOR PLYMOUTH ROCKS, WYANDOTTES, JAVAS AND DOMINQUES

SYMMETRY 4	
WEIGHT 4	
CONDITION 4	
COMB 8	
HEAD 4	Shape 2, color 2.

BEAK 4	Shape 2, color 2.
EYES 4	Shape 2, color 2.
WATTLES AND EAR LOBES 5	Shape 2, color 3.
NECK 8	Shape 3, color 5.
WINGS 9	Shape 4, color 5.
BACK 11	Shape 6, color 5.
TAIL 10	Shape 5, color 5.
BREAST 11	Shape 6, color 5.
BODY AND FLUFF 8	Shape 5, color 3.
LEGS AND TOES 6	Shape 3, color 3.
Total 100	

SCALE OF POINTS FOR BRAHMAS, COCH- INS AND LANGSHANS

SYMMETRY 4	
WEIGHT 6	
CONDITION 4	
COMB 8	
HEAD 6	Shape 3, color 3.
EYES 4	Shape 2, color 2.
WATTLES AND EAR LOBES 5	Shape 2, color 3.
NECK 9	Shape 4, color 5.
WINGS 8	Shape 4, color 4.
BACK 11	Shape 6, color 5.
TAIL 9	Shape 4, color 5.
BREAST 10	Shape 5, color 5.
BODY AND FLUFF 8	Shape 5, color 3.
LEGS AND TOES 8	Shape 5, color 3.
Total 100	

SCALE OF POINTS FOR BOOTED WHITE, BRAHMA, AND ALL COCHIN AND JAPAN- ESE BANTAMS

SYMMETRY 8	
WEIGHT 6	
CONDITION 6	
COMB 8	
HEAD 6	Shape 3, color 3.
WATTLES AND EAR LOBES 6	Shape 4, color 6.
NECK 10	Shape 4, color 6.
WINGS 8	Shape 4, color 4.
BACK 8	Shape 4, color 4.
TAIL 8	Shape 4, color 4.
BREAST 10	Shape 5, color 5.
BODY AND FLUFF 8	Shape 5, color 3.
LEGS AND TOES 8	
Total 100	

SCALE OF POINTS FOR DORKINGS, RED CAPS, AND OR- PINGTONS

SYMMETRY 4	
WEIGHT 6	
CONDITION 4	
COMB 8	
HEAD 4	Shape 2, color 2.
BEAK 4	Shape 2, color 2.
EYES 4	Shape 2, color 2.
WATTLES AND EAR LOBES 5	Shape 2, color 3.
NECK 8	Shape 4, color 4.
WINGS 8	Shape 4, color 4.
BACK 10	Shape 5, color 5.
TAIL 9	Shape 5, color 4.
BREAST 10	Shape 5, color 5.
BODY AND FLUFF 8	Shape 5, color 3.
LEGS AND TOES 8	Shape 5, color 3.
Total 100	

FEEDING FARM ANIMALS

THE COMPOSITION OF THE ANIMAL BODY.

The chemical substances composing the animal body, are classified as **Water, Ash, Fat, Protein** and herein the **Contents of the Stomach** are considered as separate matter. The percentage of each of these substances as determined by the U. S. Department of Agriculture (Farmers' Bulletin No. 346) is as follows:

Percentage Composition of Live Animals.

	Ox				Sheep					Swine	
	Well Fed	Half Fed	Fat	Fat Calf	Lean	Well Fed	Half Fed	Fat	Very Fat	Well Fed	Fat
Water.....	54.3	50.2	43.6	60.1	56.6	53.7	50.7	44.8	39.0	53.9	42.0
Ash.....	4.8	4.4	3.9	4.5	3.4	3.3	3.2	2.9	2.8	2.7	1.8
Fat.....	7.1	14.9	26.8	13.1	8.6	13.2	18.3	28.1	37.2	22.5	40.2
Protein.....	15.8	15.5	13.7	15.3	15.4	14.8	13.8	12.2	11.0	13.9	11.0
Contents of stomach & intestines..	18.0	15.0	12.0	7.0	16.0	15.0	14.0	12.0	10.0	7.0	5.0
Total..	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

It is to be noted from this table that the **Protein, Ash, and Water** of the body do not increase as fast as the **Fat**. Their percentages compared to the increased weight of the animal being fattened, as the fattening progresses, are therefore smaller.

Fat is a reserve material of the body. It furnishes **Heat and Energy** to the animal for keeping up the vital processes in time of special need or famine.

According to the Bulletin quoted above, **Protein, Ash, and Water** constitute the essential working parts of the animal body. The bones, regarded as the framework, the ligaments, muscles and tendons which bind together and move the bones, the skin and hair or wool, which cover and protect the animal body, the internal organs comprising those of circulation, respiration, digestion, excretion and secretion, and reproduction, the brain and nerves,—in fact all the mechanisms of the body—are to be regarded as being composed substantially of these three classes of substances.

Mechanically, the body of an animal is a very wonderful machine; but what is of peculiar interest in this connection is that the body is what the engineer calls a prime motor—that is, like the steam or gasoline engine, it moves itself and may also supply power to move other machines. Such an engine requires two things for its operation: (1) Sufficient repair material to keep its working parts in running order and (2) a supply of fuel in proportion to the work to be done. Now just these same two things are what the animal requires—repair material and fuel.

We do not need a physiologist to tell us that when an animal is deprived of food its tissues waste away, while its **Fat** is burned up in an effort to keep the bodily machinery in motion. Therefore, we must here consider the feed in these two relations.

THE COMPOSITION OF FEEDING STUFFS.

It has been found by analysis that the foods for domestic animals are composed of substances of the same general character as those in the animal's body. Farmers' Bulletin No. 22, U. S. Department of Agriculture, describes these substances as follows:

WATER.—Rarely less than one-half and sometimes almost three-fourths of the weight of the live animal consists of water. The proportion of water is greatest in young and lean animals and decreases as they become more mature or fatter.

ASH.—Ash is what is left, the residue, when the combustible part of a feeding stuff is burned away. It consists chiefly of lime, magnesia, potash, iron, chlorin, and carbonic, sulphuric, and phosphoric acid; its use is most largely in the making of the bones. From the ash constituents of the food the digestive organs of the animal select those which are needed and the rest is voided in the manure. As a general rule rations composed of a variety of nutritious foods contain sufficient ash to supply the requirements of the body.

FAT.—**Fat**, or the material which in analysis is dissolved from a feeding stuff by *ether*, includes, besides real fats, wax, the green coloring matter of plants, etc. For this reason the ether extract is usually designated *Crude Fat*. The fat of food is either stored up in the body as fat or burned (oxidized in the body) to furnish heat and energy.

CARBOHYDRATES.—Carbohydrates are usually divided into two groups: (1) **Nitrogen-Free Extract**, including starch, sugar, gums and the like; and (2) **Cellulose or Fiber**, the essential constituent of the walls of vegetable cells. Cotton fiber and wood pulp are nearly pure cellulose. Coarse fodders, like hay and straw, contain a large proportion of fiber, while most grains contain little fiber, but are rich in starch, sugar, etc. (nitrogen-free extract). The carbohydrates form the largest part of all vegetable foods. They are not per-

manently stored up as such in the animal body, but are either *stored up as fat* or burned in the system *to produce heat and energy*. They are one of the principal sources of animal fat.

PROTEIN.—**Protein** (or the nitrogenous materials) is the name of a group of materials containing nitrogen. All other constituents of feeding stuffs, the ash, fat, and carbohydrates, are non-nitrogenous, or free from nitrogen. The Protein materials are often designated as flesh formers, because they furnish the materials for the *lean flesh*; but they also enter largely into the composition of *blood, skin, muscles, tendons, nerves, hair, horns, wool*, and the *casein* and *albumen* of milk, etc. For the formation of these materials **Protein is absolutely indispensable**. No substance free from nitrogen can be worked over into protein, or fill the place of protein. It is, then, absolutely necessary for an animal to be provided with a certain amount of protein in order to grow or to maintain existence. Under certain conditions it is believed protein may be a source of fat in the body; and finally it may be burned, like carbohydrates and fat, yielding heat and energy.

SOURCES OF HEAT AND ENERGY.—The sources of **Heat and Energy** in the animal, then, are protein, fat, and carbohydrates of the food, and the fat and protein of the body, for the fat and protein of the body may be burned like that in the food. The value of the fat for producing heat is nearly two and one-half times that of carbohydrates or protein. The sources of the fat in the body are the fat, carbohydrates and probably the protein of the food; and the exclusive source of protein in the body is the protein in the food.

The protein of the foods, produces **Heat, Energy, and Fat** in the animal body, just as the **Fats and Carbohydrates** do. In addition to this function, it does what fat and carbohydrates cannot do, viz: it makes *muscle, blood, skin, tendons, nerves, hair, horns, wool*, and the *casein* and *albumen* of milk, and builds the animal frame.

FUEL VALUE OF FEEDING STUFFS.

The primary functions of food are to produce heat for the body and energy for work. The value of food for this purpose is measured in **Heat Units** or **Calories**, and is calculated from the nutrients digested. Thus the fuel power of one pound of digestible fat is estimated to be 4.22 calories, and of one pound of digestible Protein and Carbohydrates about 1.86 calories. The total fuel value of a feeding stuff is found by using these factors. As an example, the meaning of the figures in the following table denote that in 100 pounds of Cottonseed Meal containing an average amount of dry matter (91.8 pounds) there are contained approximately 35.4 pounds of digestible protein (materials containing nitrogen), 23.5 pounds of digestible carbohydrates (starch, sugar, fiber, etc.), and 5.9 pounds of digestible fat; and it is ascertained that these materials when consumed in the body will yield 134.452 calories of heat, furnishing energy for work and maintaining the temperature of the body.

EXPLANATION OF TERMS USED IN U. S. LITERATURE OF FEEDING

The Calorie is the amount of heat required to raise 1 kilogram of water 1 degree of the Centigrade thermometer; or, in terms more familiar to us, approximately 1 pound of water 4 degrees of Fahrenheit thermometer.

The Nutritive Ratio is the ratio of the digestible protein of a feed to the combined digestible fat, and digestible carbohydrates, after multiplying the fat by two and one-fourth. Fat is two and one-fourth times more valuable than carbohydrates as a heat and energy producer.

The Digestive Coefficient of a food is the percentage of protein, fat, and carbohydrates (which consists of fiber and nitrogen-free extract) that is digested and utilized by the animal. The following table shows the **percentage of each ingredient** of the food that is digested in six well-known feeds.

Feeding Stuff	Dry Matter	Protein	Carbohydrates		Fat
			Fiber	N-Free Extract	
	Per Cent	Per Cent	Per Cent	Per Cent	Per Cent
Corn Meal.....	90	74	57	94	93
Gluten Meal.....	88	85	55	90	93
Wheat Bran.....	67	76	43	74	62
Oats.....	70	78	35	81	87
Cotton Seed Meal..	77	84	37	75	95
Oil Meal.....	79	89	57	78	89

An examination of the above table will show that 90% of the total dry matter in corn is digested by the animal and therefore in this case, corn would have a digestive coefficient of 90%. Only 57% of the fiber in corn meal is digested, though 93% of the fat is utilized by the animal. Every stockman can well afford to make close study of the above table in order that he may grasp the idea that the animal assimilates only part of the food consumed.

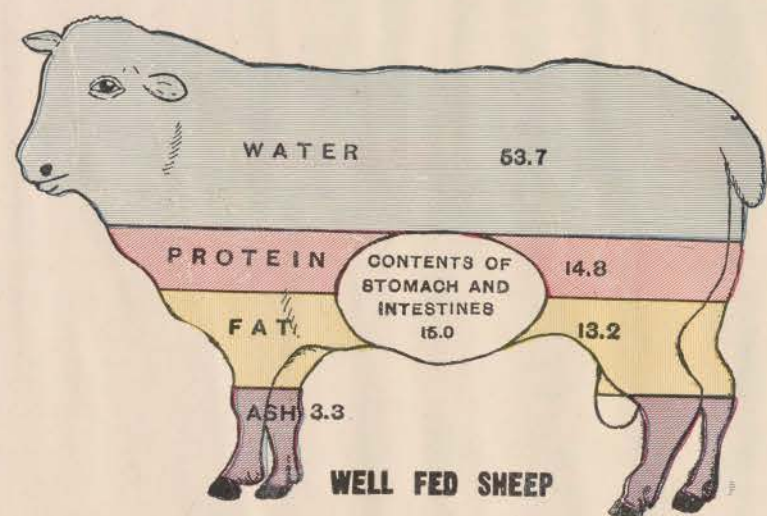
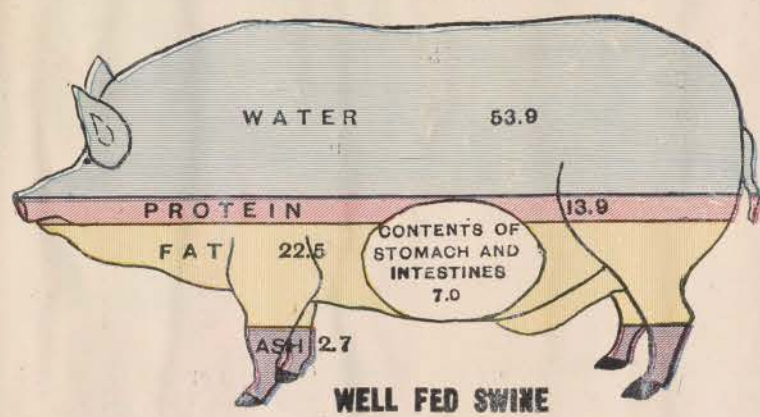
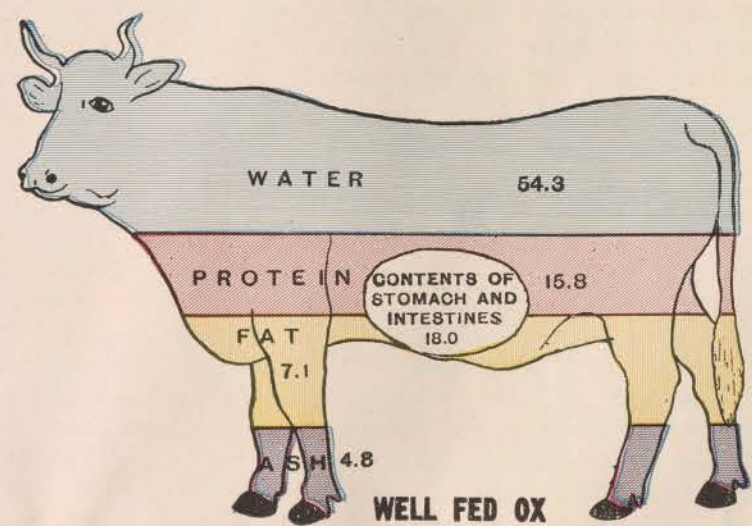
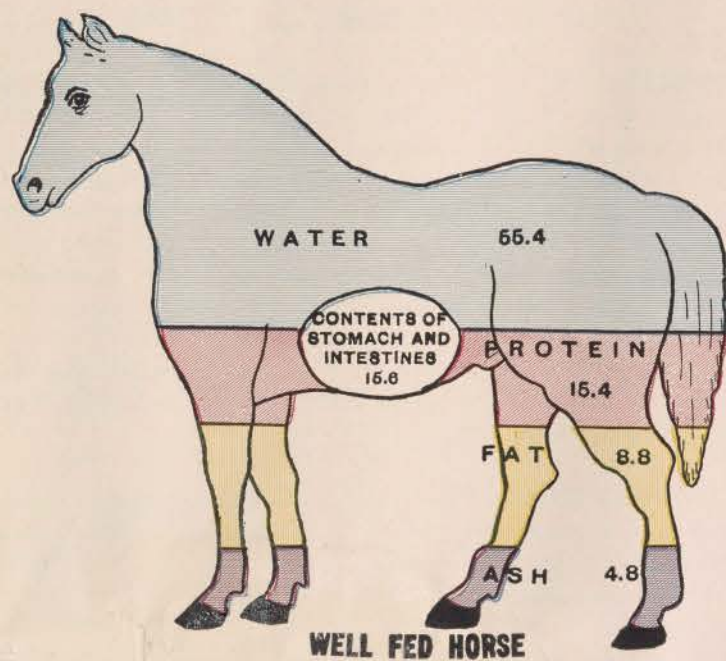
The ash constituents of a food has an important bearing on its value for farm animals and among all of the foodstuffs corn is positively the lowest in ash, and because of this, it is generally necessary to supply mineral matter in the form of salt or air-slaked lime when corn is fed heavily to hogs.

See following pages for Illustrations in colors showing *Crude Contents of the Chief Feeds, and the best methods of using same.*

FEEDING FARM ANIMALS

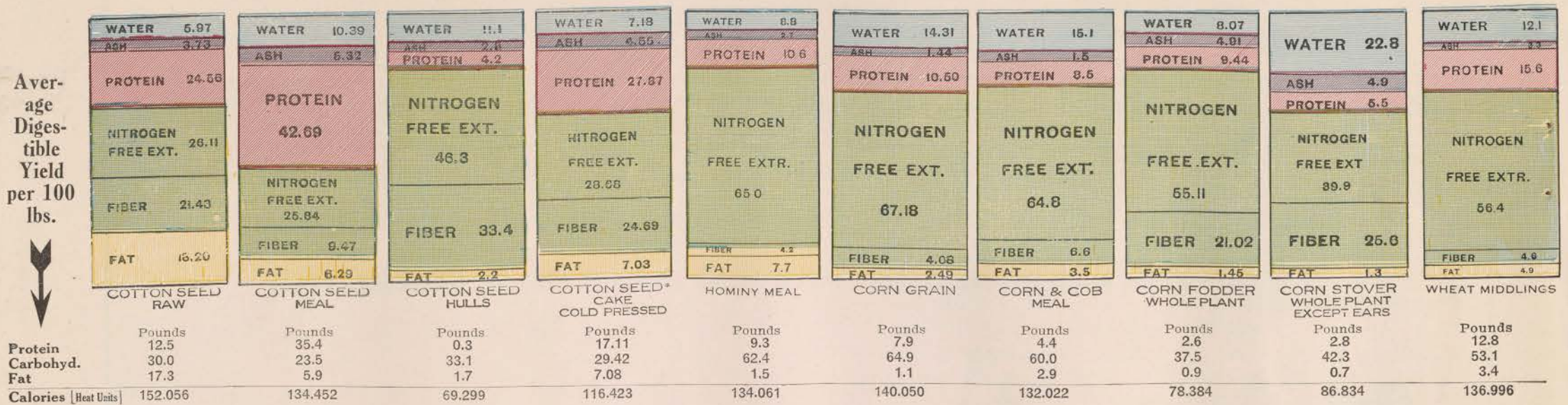


ALL EXCEPT WATER SERVE AS FUEL TO YIELD ENERGY IN THE FORMS OF HEAT AND MUSCULAR POWER



The above illustrations show the chemical contents of these Farm Animals

The Colored Charts on This and the Next Few Pages Show the Average Crude Contents of the Chief Feeds



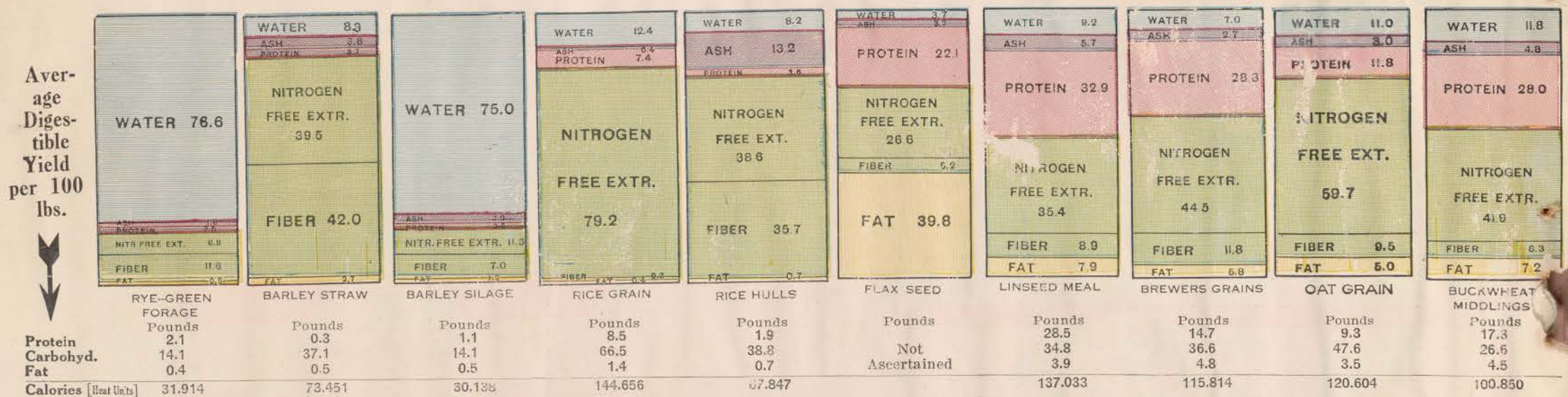
COTTONSEED (RAW)—This product is used to some extent in the South in the feeding of steers and dairy cows. It has been found in certain experiments that the seed when priced at \$7 per ton could be used in making much cheaper gains than were obtained from feeding cottonseed meal at three times this cost. As in the case of flaxseed, better results are obtained, all things considered, by extracting the oil and feeding the residue. In that case it becomes a product having a much higher flesh-forming content.

COTTONSEED MEAL—One of the rich concentrated meals used extensively in cattle feeding operation. Steers fed heavily on corn will make economical use of from two to four pounds of cottonseed meal daily. After 120 days the feeding of cottonseed meal is attended with more or less risk, as it eventually becomes injurious to the lining of the stomach. It is a splendid product to use in conjunction with ensilage and as much as two pounds of gain daily can be made on a steer weighing 1,000 pounds by feeding a full ration of ensilage and three pounds of cottonseed meal daily. It is not a safe hog feed, as it tends to act as a poison after six or eight weeks of feeding. It may be used to advantage in feeding dairy cows, but should not be fed in larger quantity than two, or at the outside, three pounds daily to the average cow.

CORN (GRAIN)—The best of all grains for fattening purposes when used for feeding hogs, steers or horses. It is a one-sided food and should be used in conjunction with such concentrates as oil meal or cottonseed meal when fed to fattening steers or dairy cows and in conjunction with tankage or oil meal when fed to hogs. A ration of one part corn and twelve parts tankage is almost a perfect one for fattening hogs, while corn eight parts and oil meal one part will also give good results. It may be fed to hogs in a self-feeder with no risk from gorging. Corn is lacking in mineral elements and it is therefore advisable to supplement the mineral supply. Hogs fed heavily on corn should have access to a mixture composed of charcoal four parts, air slaked lime one part and salt one part. When horses and cattle are fed corn heavily they must be well supplied with salt.

CORN AND COB MEAL—Pound for pound this product is worth practically as much as pure corn meal when it is used for dairy cows or steers. The cob is not supposed to have feeding value, but it adds bulk to the ration, so that the grain is more completely digested and assimilated. It may be used for work horses, particularly where animals are inclined to bolt their grain. It is an excellent food for male breeding animals, as there is little danger of foundering, no matter how heavily it is fed.

Average Crude Contents of These Feeds



CORN FODDER (WHOLE PLANT)—Can be fed economically only when used in small quantities for stock cattle, or, on the other hand, fed heavily to fattening cattle where hogs have access to the sheds and yards. In most cases the ears are husked out or snapped off before the fodder is fed. This would not be practicable unless labor is comparatively inexpensive. Corn fodder makes a good form of roughage for dairy cows, particularly if the grain part of the ration is balanced. It is a splendid fodder for idle horses, though most of the grain should be removed before feeding for the purpose of economizing in the amount of grain consumed.

CORN STOVER (WHOLE PLANT EXCEPT EARS)—This is a safe food to use for all classes of stock during the winter months and it is especially to be recommended for idle horses, for stock cattle and in lesser quantity for dairy cows. It deteriorates rapidly in the spring months and therefore it should be fed out while it is reasonably fresh. The most economical use can be made of corn stover by shredding it and afterwards storing it in a stack or mow. Free tramping is necessary at time of storing because compactness is an important factor in excluding air. Corn stover should never be shredded when it is wet.

WHEAT MIDDINGS—This is primarily a food for hogs and is a balanced ration in itself. Should be fed in the form of a thick slop, as it is too doughy in its nature to be fed dry advantageously. It may be used in conjunction with corn, half and half, and fed to hogs with reasonable expectation of making satisfactory gains. Much used in compounding a ration for dairy cows. A mixture of five pounds of corn, three pounds of wheat middlings and two pounds of oil meal will make an almost ideal daily ration for a 1,000-pound dairy cow. It is not a good horse feed, as it is apt to cause impaction.

FLAX SEED—Must be fed in limited quantities to all classes of stock, as its richness in fat makes it unpalatable where it is used continuously. It is a highly concentrated food, but is usually so high in price as to take it out of the list of live stock foods. Where a food of this character is used to balance the ration it is much better to use oil meal, which is made from flax after the oil has been extracted, than it is to feed the whole seed.

OAT GRAIN—A very satisfactory food for the hogs when it can be purchased at a reasonable cost. It is practically a balanced ration and 100 pounds of gain can be made with 20 per cent less of oat feed than with corn. It is not necessary to feed concentrated products in conjunction with it.

BALANCED RATIONS—Made Up From Chief Feeds

A BALANCED RATION is a ration made up of feeds whose nutritive ratio is about 1 to 6, and containing a sufficient volume of feeding material for the animal according to the particular species fed. That is, the ratio of the total digestible protein to the combined digestible fats and digestible carbohydrates as explained in the following Formulas:

The following Feeding Stuffs Formulas, from one of our leading chemical laboratories, are given in the hope that Feeders will see the advantage and economy of feeding to all Farm Animals a Ration that is properly balanced.

The formulas are based on feeding standards, and are intended to give a balanced daily ration for 1,000 pounds live weight in all cases. They are calculated to digestible matter in the various feeding stuffs of average composition.

The heat value of the Fat, and therefore the feeding value, being 2.25 times that of the Carbohydrates, the Fat is multiplied by that factor and combined with the Carbohydrates.

To secure the best results, the feeds used should always be of the same grade.

The best available feed stuff in a certain locality being known, the stockman can easily select a formula which will be suitable for his needs.

DAILY RATION FOR HORSE OR MULE DOING HEAVY WORK.

Feeding Stuffs	Pounds	Digestible Protein Carbohydrates & Fat	Nutritive Ratio
No. 1.			
Oil Meal.....	2		
Alfalfa.....	12		
Corn Shucks.....	10		
Cane Molasses.....	4		
Total.....	28	16.6	1 to 6.2
No. 2.			
Cottonseed Meal.....	1		
Brewer's Grain (dry).....	8		
Corn.....	4		
Prairie Hay.....	15		
Total.....	28	16.2	1 to 6.1
No. 3.			
Corn and Cob Meal.....	9		
Cane Molasses.....	6		
Peavine Hay.....	15		
Total.....	30	17.2	1 to 6.1
No. 4.			
Wheat Middlings.....	6		
Timothy and Clover Hay.....	20		
Cane Molasses.....	2		
Corn.....	4		
Total.....	32	17.0	1 to 6.1
No. 5.			
Oats.....	10		
Brewer's Grain (dry).....	5		
Timothy and Clover Hay.....	15		
Total.....	30	17.3	1 to 6.2
No. 6.			
Corn.....	4		
Oats.....	10		
Timothy Hay.....	10		
Total.....	24	17.0	1 to 6.4

MODERATELY HEAVY WORK.

No. 1.			
Oil Meal.....	2		
Corn and Cob Meal.....	7		
Lespedeza Hay.....	8		
Cane Molasses.....	5		
Total.....	22	13.4	1 to 6.4
No. 2.			
Corn and Cob Meal.....	7		
Lespedeza Hay.....	15		
Cane Molasses.....	2		
Total.....	24	13.7	1 to 6.6
No. 3.			
Oil Meal.....	2		
Corn and Cob Meal.....	5		
Alfalfa.....	10		
Cane Molasses.....	7		
Total.....	23	14.7	1 to 6.3
No. 4.			
Oats.....	6		
Alfalfa.....	5		
Corn Shucks.....	9		
Cane Molasses.....	4		
Total.....	24	14.0	1 to 6.1
No. 5.			
Bran.....	2		
Corn and Cob Meal.....	4		
Bermuda Grass Hay.....	18		
Total.....	24	13.8	1 to 6.9
No. 6.			
Wheat Middlings.....	8		
Timothy and Clover Hay.....	15		
Total.....	23	13.4	1 to 6.9

DAILY RATION FOR HORSE OR MULE DOING LIGHT WORK.

No. 1.			
Oil Meal.....	2		
Corn Meal.....	3		
Johnson Grass Hay.....	18		
Total.....	23	12.0	1 to 6.7

No. 2.			
Oats.....	2		
Corn.....	7		
Prairie Hay.....	12		
Total.....	21	12.1	1 to 7
No. 3.			
Bran.....	3		
Corn and Cob Meal.....	3		
Timothy and Clover Hay.....	15		
Cane Molasses.....	2		
Total.....	23	12.3	1 to 7
No. 4.			
Oil Meal.....	2		
Prairie Hay.....	10		
Wheat Bran.....	4		
Cane Molasses.....	5		
Total.....	21	11.7	1 to 6.8

DAILY RATION FOR MILCH COWS.

No. 1.			
Ground Oats.....	5		
Red Clover Hay.....	10		
Corn and Cob Meal.....	8		
Corn Shucks.....	4		
Total.....	27	17.0	1 to 6.2
No. 2.			
Gluten Meal.....	5		
Peavine Hay.....	10		
Corn Silage.....	20		
Wheat Straw.....	18		
Total.....	53	17.4	1 to 6.6
No. 3.			
Wheat Bran.....	5		
Cottonseed Hulls.....	20		
Peavine Hay.....	10		
Total.....	35	15.3	1 to 5.7
No. 4.			
Oil Meal.....	4		
Cottonseed Hulls.....	20		
Johnson Grass Hay.....	15		
Total.....	39	16.1	1 to 5.7
No. 5.			
Ground Oats.....	5		
Alfalfa Hay.....	7		
Corn and Cob Meal.....	8		
Corn Stover.....	10		
Total.....	30	16.4	1 to 6.3
No. 6.			
Oil Meal.....	4		
Wheat Bran.....	5		
Oat Straw.....	20		
Corn Silage.....	30		
Total.....	59	17.2	1 to 6.7
No. 7.			
Gluten Meal.....	4		
Corn and Cob Meal.....	8		
Millet Hay (cat tails).....	20		
Total.....	32	17.0	1 to 6.2
No. 8.			
Wheat Middlings.....	8		
Corn Stover.....	20		
Corn Shucks.....	5		
Total.....	33	17.2	1 to 5.5
No. 9.			
Gluten Meal.....	10		
Cottonseed Hulls.....	35		
Total.....	45	17.3	1 to 6.4
No. 10.			
Wheat Bran.....	9		
Cottonseed Hulls.....	20		
Corn and Cob Meal.....	8		
Total.....	37	17.7	1 to 6.5
No. 11.			
Soy Bean Meal.....	6		
Cottonseed Hulls.....	20		
Rye Straw.....	13		
Total.....	39	16.8	1 to 6.1
No. 12.			
Alfalfa Meal.....	8		
Cottonseed Hulls.....	20		
Corn Fodder (leaves).....	12		
Total.....	40	17.9	1 to 6.6
No. 13.			
Wheat Middlings.....	8		
Cottonseed Hulls.....	18		
Timothy Hay.....	12		
Total.....	38	16.5	1 to 6.3

No. 14.			
Wheat Bran.....	8		
Cottonseed Hulls.....	20		
Crab Grass Hay.....	13		
Total.....	41	16.6	1 to 6.3
No. 15.			
Soy Bean Meal.....	6		
Cottonseed Hulls.....	20		
Johnson Grass Hay.....	14		
Total.....	40	16.5	1 to 6.0
No. 16.			
Gluten Meal.....	7		
Cottonseed Hulls.....	19		
Corn Silage.....	45		
Total.....	71	15.6	1 to 5.9
No. 17.			
Oil Meal.....	5		
Cottonseed Hulls.....	20		
Corn Fodder (whole plant).....	15		
Total.....	40	16.9	1 to 6.3
No. 18.			
Wheat Bran.....	7		
Cottonseed Hulls.....	18		
Corn Stover.....	15		
Total.....	40	16.6	1 to 6.1
No. 19.			
Wheat Middlings.....	7		
Cottonseed Hulls.....	18		
Sorghum Silage.....	40		
Total.....	65	16.0	1 to 6.3
No. 20.			
Peanut Meal.....	4		
Cottonseed Hulls.....	20		
Orchard Grass Hay.....	12		
Total.....	36	13.7	1 to 5.7
No. 21.			
Wheat Bran.....	8		
Cottonseed Hulls.....	20		
Oat Straw.....	10		
Total.....	38	16.3	1 to 5.7
No. 22.			
Oil Meal.....	6		
Cottonseed Hulls.....	20		
Wheat Straw.....	10		
Total.....	36	17.9	1 to 6.5
No. 23.			
Soy Bean Meal.....	5		
Wheat Bran.....	4		
Oat Straw.....	25		
Total.....	34	15.6	1 to 5.8
No. 24.			
Peanut Meal.....	4		
Wheat Bran.....	4		
Wheat Straw.....	18		
Total.....	26	16.0	1 to 6.3
No. 25.			
Ground Oats.....	10		
Wheat Bran.....	4		
Rye Straw.....	20		
Total.....	34	15.6	1 to 6.4
No. 26.			
Wheat Middlings.....	8		
Corn Silage.....	10		
Wheat Straw.....	15		
Total.....	33	16.4	1 to 5.9
No. 27.			
Oil Meal.....	5		
Cottonseed Hulls.....	20		
Cane Molasses.....	10		
Total.....	35	16.6	1 to 6.2
No. 28.			
Wheat Bran.....	8		
Corn and Cob Meal.....	4		
Oat Straw.....	10		
Cane Molasses.....	7		
Total.....	29	16.6	1 to 6.2
No. 29.			
Peanut Meal.....	2		
Cottonseed Hulls.....	6		
Peavine Hay.....	10		
Corn Stover.....	15		
Total.....	33	15.7	1 to 6.4
No. 30.			
Gluten Meal.....	3		
Corn and Cob Meal.....	3		
Bermuda Grass Hay.....	19		
Cane Molasses.....	3		
Total.....	28	15.8	1 to 6.1

Average Crude Contents of These Feeds

Average Digestible Yield per 100 lbs.	<div><div>WATER 11.17</div><div>ASH 2.00</div><div>PROTEIN 18.94</div><div>NITROGEN</div><div>FREE EXT. 64.17</div><div>FIBER 2.05</div><div>FAT 1.01</div></div> <div>WHEAT (GRAIN)</div>	<div><div>WATER 7.3</div><div>ASH 3.0</div><div>PROTEIN 31.2</div><div>NITROGEN</div><div>FREE EXT. 36.0</div><div>FIBER 11.0</div><div>FAT 12.6</div></div> <div>GLUTEN MEAL</div>	<div><div>WATER 12.71</div><div>ASH 6.92</div><div>PROTEIN 18.02</div><div>NITROGEN</div><div>FREE EXT. 47.70</div><div>FIBER 11.00</div><div>FAT 6.15</div></div> <div>WHEAT BRAN</div>	<div><div>WATER 11.07</div><div>ASH 3.88</div><div>PROTEIN 17.75</div><div>NITROGEN</div><div>FREE EXT. 56.47</div><div>FIBER 5.99</div><div>FAT 4.24</div></div> <div>WHEAT SHORTS</div>	<div><div>WATER 10.07</div><div>ASH 6.50</div><div>PROTEIN 10.08</div><div>NITROGEN</div><div>FREE EXT. 59.05</div><div>FIBER 14.58</div><div>FAT 0.74</div></div> <div>WHEAT STRAW</div>	<div><div>WATER 62.2</div><div>ASH 7.2</div><div>NITROGEN</div><div>FREE EXT. 49.4</div><div>FIBER 10.1</div><div>FAT 7.1</div></div> <div>OAT-GREEN FORAGE</div>	<div><div>WATER 7.7</div><div>ASH 1.1</div><div>PROTEIN 16.0</div><div>NITROGEN</div><div>FREE EXT. 49.4</div><div>FIBER 10.1</div><div>FAT 7.1</div></div> <div>OAT FEED</div>	<div><div>WATER 11.8</div><div>ASH 1.8</div><div>PROTEIN 10.8</div><div>NITROGEN</div><div>FREE EXT. 72.5</div><div>FIBER 1.4</div><div>FAT 1.4</div></div> <div>RYE-GRAIN</div>	<div><div>WATER 13.1</div><div>ASH 0.7</div><div>PROTEIN 6.7</div><div>NITROGEN</div><div>FREE EXT. 78.3</div><div>FIBER 1.9</div><div>FAT 1.9</div></div> <div>RYE FLOUR</div>	<div><div>WATER 7.1</div><div>ASH 1.1</div><div>PROTEIN 1.1</div><div>NITROGEN</div><div>FREE EXT. 46.8</div><div>FIBER 38.9</div><div>FAT 1.3</div></div> <div>RYE STRAW</div>	
	Protein	10.2	25.5	12.3	13.7	0.4	2.7	15.9	9.1	7.7	0.9
	Carbohyd.	69.2	42.3	37.0	45.8	36.3	22.7	49.1	69.7	61.1	37.6
	Fat	1.7	10.4	2.6	3.7	0.4	1.0	3.7	1.4	1.9	1.3
	Calories (Heat Units)	154.859	169.930	102.672	126.684	69.929	51.624	122.247	152.400	139.338	71.831

WHEAT (GRAIN)—The price of this grain as compared with other live stock foods is usually such as to entitle it to little of the stockman's consideration. Pound for pound it is always dearer than corn and in any event it should be used only as a small part of the ration. It is almost a perfect food for hogs when soaked or ground, but is too hard for feeding in a dry condition. Sometimes it is used for work horses in conjunction with corn or oats, but in no case should it be used in a larger proportion than one-sixth or at the outside one-fifth of the ration. Under ordinary circumstances where wheat is grown on a given farm it is advisable to dispose of it and purchase cheaper food products for live stock.

WHEAT BRAN—This product is used extensively in feeding dairy cows and work horses. The character of the crude fiber in wheat bran is of such a nature as to make it unsuited to hogs, particularly when it is fed in liberal quantities. It is slightly laxative in its effects and for that reason it is well adapted to the needs of the work horse. A horse consuming twelve pounds of grain daily would thrive even though worked strenuously if the grain ration were composed of nine pounds of corn and three pounds of bran, this being fed in conjunction with twelve, or at the outside fifteen pounds of mixed hay.

GLUTEN MEAL—As this food is exceedingly rich in flesh-forming material and therefore relatively high in price, it can be used to advantage only when it is fed in supplementary quantities. For fattening steers a ration made up of seven parts of corn and one part gluten meal would result in rapid gains and these would be made more economically than if corn alone were fed. Very good results have been obtained at several experiment stations in feeding gluten meal and corn to hogs. As it is a by-product from corn, its dominant characteristic is palatability.

TIMOTHY HAY—An ideal form of roughage for idle or work horses. When properly cured it is free from dust so that its use even in large quantities is not injurious to the respiratory system of the horse. On the other hand, it is not a satisfactory form of roughage for the dairy cow, nor for fattening cattle, as it is lacking in flesh-forming materials. When used for dairy cows it must be freely supplemented with such foods as oil meal or cottonseed meal. Timothy hay should be fed very sparingly to breeding ewes, as its fibrous nature makes it poorly adapted for this purpose. Where it is grown in large quantities for stock feeding purposes better results will be obtained by disposing of the timothy hay and buying clover or alfalfa, or by purchasing the rich meals in considerable quantity.

Average Crude Contents of These Feeds

Average Digestible Yield per 100 lbs.	<table><tr><td>WATER</td><td>9.1</td></tr><tr><td>ASH</td><td>4.5</td></tr><tr><td>PROTEIN</td><td>13.2</td></tr><tr><td>NITROGEN</td><td></td></tr><tr><td>FREE EXTR.</td><td></td></tr><tr><td>63.0</td><td></td></tr><tr><td>FIBER</td><td>5.9</td></tr><tr><td>FAT</td><td>6.2</td></tr></table> <p>POULTRY FOOD ORDINARY MIXED</p> <table><tr><td>Pounds</td><td>9.6</td></tr><tr><td>Protein</td><td>65.4</td></tr><tr><td>Carbohyd.</td><td>1.5</td></tr><tr><td>Fat</td><td></td></tr><tr><td>Calories (Heat Units)</td><td>148.821</td></tr></table>	WATER	9.1	ASH	4.5	PROTEIN	13.2	NITROGEN		FREE EXTR.		63.0		FIBER	5.9	FAT	6.2	Pounds	9.6	Protein	65.4	Carbohyd.	1.5	Fat		Calories (Heat Units)	148.821	<table><tr><td>WATER</td><td>15.0</td></tr><tr><td>ASH</td><td>4.5</td></tr><tr><td>PROTEIN</td><td>6.0</td></tr><tr><td>NITROGEN</td><td></td></tr><tr><td>FREE EXTR.</td><td>41.9</td></tr><tr><td>FIBER</td><td>29.0</td></tr><tr><td>FAT</td><td>3.0</td></tr></table> <p>TIMOTHY HAY</p> <table><tr><td>Pounds</td><td>2.8</td></tr><tr><td>Protein</td><td>43.7</td></tr><tr><td>Carbohyd.</td><td>1.4</td></tr><tr><td>Fat</td><td></td></tr><tr><td>Calories (Heat Units)</td><td>92.729</td></tr></table>	WATER	15.0	ASH	4.5	PROTEIN	6.0	NITROGEN		FREE EXTR.	41.9	FIBER	29.0	FAT	3.0	Pounds	2.8	Protein	43.7	Carbohyd.	1.4	Fat		Calories (Heat Units)	92.729	<table><tr><td>WATER</td><td>20.8</td></tr><tr><td>ASH</td><td>0.6</td></tr><tr><td>PROTEIN</td><td>12.4</td></tr><tr><td>NITROGEN</td><td></td></tr><tr><td>FREE EXTR.</td><td>33.8</td></tr><tr><td>FIBER</td><td>21.9</td></tr><tr><td>FAT</td><td>4.5</td></tr></table> <p>RED CLOVER HAY</p> <table><tr><td>Pounds</td><td>6.6</td></tr><tr><td>Protein</td><td>35.3</td></tr><tr><td>Carbohyd.</td><td>1.7</td></tr><tr><td>Fat</td><td></td></tr><tr><td>Calories (Heat Units)</td><td>84.995</td></tr></table>	WATER	20.8	ASH	0.6	PROTEIN	12.4	NITROGEN		FREE EXTR.	33.8	FIBER	21.9	FAT	4.5	Pounds	6.6	Protein	35.3	Carbohyd.	1.7	Fat		Calories (Heat Units)	84.995	<table><tr><td>WATER</td><td>21.0</td></tr><tr><td>ASH</td><td>0.3</td></tr><tr><td>PROTEIN</td><td>7.8</td></tr><tr><td>NITROGEN</td><td></td></tr><tr><td>FREE EXTR.</td><td>38.0</td></tr><tr><td>FIBER</td><td>23.0</td></tr><tr><td>FAT</td><td>3.0</td></tr></table> <p>KENTUCKY BLUE GRASS HAY</p> <table><tr><td>Pounds</td><td>4.8</td></tr><tr><td>Protein</td><td>37.3</td></tr><tr><td>Carbohyd.</td><td>2.0</td></tr><tr><td>Fat</td><td></td></tr><tr><td>Calories (Heat Units)</td><td>86.516</td></tr></table>	WATER	21.0	ASH	0.3	PROTEIN	7.8	NITROGEN		FREE EXTR.	38.0	FIBER	23.0	FAT	3.0	Pounds	4.8	Protein	37.3	Carbohyd.	2.0	Fat		Calories (Heat Units)	86.516	<table><tr><td>WATER</td><td>10.4</td></tr><tr><td>ASH</td><td>7.7</td></tr><tr><td>PROTEIN</td><td>6.5</td></tr><tr><td>NITROGEN</td><td></td></tr><tr><td>FREE EXTR.</td><td>44.1</td></tr><tr><td>FIBER</td><td>30.0</td></tr><tr><td>FAT</td><td>0.4</td></tr></table> <p>SALT MARSH HAY</p> <table><tr><td>Pounds</td><td>7.7</td></tr><tr><td>Protein</td><td>35.3</td></tr><tr><td>Carbohyd.</td><td>2.1</td></tr><tr><td>Fat</td><td></td></tr><tr><td>Calories (Heat Units)</td><td>87.358</td></tr></table>	WATER	10.4	ASH	7.7	PROTEIN	6.5	NITROGEN		FREE EXTR.	44.1	FIBER	30.0	FAT	0.4	Pounds	7.7	Protein	35.3	Carbohyd.	2.1	Fat		Calories (Heat Units)	87.358	<table><tr><td>WATER</td><td>15.3</td></tr><tr><td>ASH</td><td>5.5</td></tr><tr><td>PROTEIN</td><td>7.4</td></tr><tr><td>NITROGEN</td><td></td></tr><tr><td>FREE EXTR.</td><td>42.1</td></tr><tr><td>FIBER</td><td>27.2</td></tr><tr><td>FAT</td><td>1.8</td></tr></table> <p>HAY-AVERAGE MIXED</p> <table><tr><td>Pounds</td><td>4.2</td></tr><tr><td>Protein</td><td>43.2</td></tr><tr><td>Carbohyd.</td><td>1.3</td></tr><tr><td>Fat</td><td></td></tr><tr><td>Calories (Heat Units)</td><td>53.925</td></tr></table>	WATER	15.3	ASH	5.5	PROTEIN	7.4	NITROGEN		FREE EXTR.	42.1	FIBER	27.2	FAT	1.8	Pounds	4.2	Protein	43.2	Carbohyd.	1.3	Fat		Calories (Heat Units)	53.925	<table><tr><td>WATER</td><td>7.7</td></tr><tr><td>ASH</td><td>6.0</td></tr><tr><td>PROTEIN</td><td>7.5</td></tr><tr><td>NITROGEN</td><td></td></tr><tr><td>FREE EXTR.</td><td>49.0</td></tr><tr><td>FIBER</td><td>27.7</td></tr><tr><td>FAT</td><td>1.1</td></tr></table> <p>MILLET HAY HUNGARIAN</p> <table><tr><td>Pounds</td><td>7.9</td></tr><tr><td>Protein</td><td>34.3</td></tr><tr><td>Carbohyd.</td><td>1.5</td></tr><tr><td>Fat</td><td></td></tr><tr><td>Calories (Heat Units)</td><td>86.136</td></tr></table>	WATER	7.7	ASH	6.0	PROTEIN	7.5	NITROGEN		FREE EXTR.	49.0	FIBER	27.7	FAT	1.1	Pounds	7.9	Protein	34.3	Carbohyd.	1.5	Fat		Calories (Heat Units)	86.136	<table><tr><td>WATER</td><td>71.1</td></tr><tr><td>ASH</td><td>1.2</td></tr><tr><td>PROTEIN</td><td>3.2</td></tr><tr><td>NITR. FREE EXTR.</td><td>14.2</td></tr><tr><td>FIBER</td><td>3.2</td></tr><tr><td>FAT</td><td>6.7</td></tr></table> <p>MILLET-HUNGARIAN GREEN FORAGE</p> <table><tr><td>Pounds</td><td>8.0</td></tr><tr><td>Protein</td><td>34.8</td></tr><tr><td>Carbohyd.</td><td>1.2</td></tr><tr><td>Fat</td><td></td></tr><tr><td>Calories (Heat Units)</td><td>87.229</td></tr></table>	WATER	71.1	ASH	1.2	PROTEIN	3.2	NITR. FREE EXTR.	14.2	FIBER	3.2	FAT	6.7	Pounds	8.0	Protein	34.8	Carbohyd.	1.2	Fat		Calories (Heat Units)	87.229	<table><tr><td>WATER</td><td>64.8</td></tr><tr><td>ASH</td><td>1.2</td></tr><tr><td>NITR. FREE EXTR.</td><td>19.0</td></tr><tr><td>FIBER</td><td>10.0</td></tr><tr><td>FAT</td><td>0.4</td></tr></table> <p>GUINEA GRASS</p> <table><tr><td>Pounds</td><td>8.9</td></tr><tr><td>Protein</td><td>38.1</td></tr><tr><td>Carbohyd.</td><td>1.6</td></tr><tr><td>Fat</td><td></td></tr><tr><td>Calories (Heat Units)</td><td>93.387</td></tr></table>	WATER	64.8	ASH	1.2	NITR. FREE EXTR.	19.0	FIBER	10.0	FAT	0.4	Pounds	8.9	Protein	38.1	Carbohyd.	1.6	Fat		Calories (Heat Units)	93.387	<table><tr><td>WATER</td><td>10.9</td></tr><tr><td>ASH</td><td>1.7</td></tr><tr><td>PROTEIN</td><td>17.0</td></tr><tr><td>NITROGEN</td><td></td></tr><tr><td>FREE EXTR.</td><td>34.8</td></tr><tr><td>FIBER</td><td>26.3</td></tr><tr><td>FAT</td><td>1.5</td></tr></table> <p>ALFALFA MEAL</p> <table><tr><td>Pounds</td><td>Not Ascertained</td></tr><tr><td>Protein</td><td></td></tr><tr><td>Carbohyd.</td><td></td></tr><tr><td>Fat</td><td></td></tr><tr><td>Calories (Heat Units)</td><td></td></tr></table>	WATER	10.9	ASH	1.7	PROTEIN	17.0	NITROGEN		FREE EXTR.	34.8	FIBER	26.3	FAT	1.5	Pounds	Not Ascertained	Protein		Carbohyd.		Fat		Calories (Heat Units)	
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WHEAT SHORTS—This product may be used alone for brood sows, for young pigs, or even for fattening hogs. Its value in most cases makes it necessary to use it only as part of the ration. When fed to hogs in conjunction with corn, half and half, very rapid gains will be made. It is well adapted to the needs of dairy cows and for a cow weighing 1,000 pounds a very good daily ration would be wheat shorts four pounds, corn meal four pounds and oil meal two pounds. When fed in liberal quantities to hogs it should be used in the form of slop, as this prevents waste. Dry wheat shorts would be blown out of the trough by the winds and by the breath of the hogs as they are consuming the product.

WHEAT STRAW—A form of cheap roughage that may be used for stock cattle and fattening steers. Although it contains a lower percentage of crude fiber than oat straw, this fiber is of such a nature as to make it somewhat indigestible. It may be used in conjunction with clover hay or alfalfa hay, the latter two acting as laxatives and counteracting any injurious effect resulting from the use of wheat straw fiber. Its cleanliness makes it well adapted for use as bedding, particularly for young pigs. Unless badly rusted there is no dust on wheat straw that will irritate the skin.

RYE STRAW—An almost valueless product as a food for farm animals owing to its large proportion of crude fiber. The fiber is not palatable as in some other crops and therefore rye straw can be used advantageously for stock cattle when richer fodders are fed in connection with it. It makes a clean bedding for live stock and is ideal when used for this purpose in hog pens, there being no injurious dust on this straw to irritate the skin.

CLOVER HAY—This product may be used to great advantage in feeding fattening steers, dairy cows or idle horses. Its richness in protein gives it a special value and to a large extent it may be made to take the place of the richer grains in the ration. Red clover hay and ensilage go exceedingly well together and it is possible to make as much as two pounds of gain per head daily on steers by using these products. Without grain it makes an ideal form of roughage for sheep and especially for fattening lambs. Where heavy corn feeding is practiced the use of clover hay is exceedingly advantageous. It is a product that must be used sparingly in the feeding of work horses owing to a peculiar dust that is usually present and which is injurious to the respiratory system. The history of most wind-broken horses can be traced to the injudicious use of clover hay.

RYE FLOUR—A product too much refined to bring it into the class of live stock foods. Could be used for putting on the finishing touches of fattening animals or fed to young calves along with oil meal or a small proportion of cottonseed meal. It must be either mixed with other grain or fed wet owing to its peculiar nature which results in gumming up the lips of animals.

RYE (GRAIN)—A very palatable grain when ground or soaked and is especially adapted for hog feeding purposes. Claimed by many to have a special medicinal effect and is used extensively in conjunction with corn for brood sows. A ration composed of equal parts ground or soaked rye and corn could scarcely be improved upon for brood sows or for young pigs. In some instances rye is steamed before feeding. The process does not render the starchy part of the grain more digestible, but it apparently increases its palatability so that it is readily assimilated when taken into the system.

CHIEF FEEDS--Continued

GUINEA GRASS—A low grade product lacking in flesh-gaining material. But little attention has been paid to the feeding value of this grass by the experiment stations.

HOMINY MEAL—As a feeding product this meal has practically the same value as corn and its use would therefore depend upon its market value. It is not as palatable as corn and for that reason there is no wide demand for it. In any event, the supply is limited.

PEANUT CAKE—This is made from peanuts after the oil has been taken out and it is one of the richest of all the meals. With the growth of the peanut industry it is apt to become an important by-product, because it is well adapted to the needs of dairy cows and to fattening animals. A comparatively small proportion of this product should be used in a ration made up largely of corn, and good results could be expected from feeding one part ground peanut meal and twelve parts corn.

BUCKWHEAT MIDLINGS—As buckwheat is largely grown as a catch crop, it is not extensively used as a feeding product, the grain being in the main converted into flour as a human food. The midlings are rich in flesh-forming material and must therefore be used as a supplement to other grains. If fed to dairy cows, one part of buckwheat midlings and eight parts of corn makes a suitable ration.

BARLEY STRAW—It comes next in the list to oat straw as a form of low grade feeding roughage. Although it contains a large percentage of crude fiber, this fiber is, nevertheless, palatable and stock cattle or even fattening steers will consume considerable quantities of this straw. One objection to the feeding of barley straw is that the presence of beards or awns is apt to injure the eyes of farm animals. It is a bad practice therefore to allow farm animals to have access to barley straw stacks, though injury to the eyes is not so apt to occur when the product is fed from low mangers.

KENTUCKY BLUE GRASS HAY—In the main this is a worthless product unless the crop has been cut just as it is heading out. In that case the yield will be very light, because the hay will shrink to a point that will make the harvesting of it a profitless venture. The great reputation of blue grass as an animal food has been made because of its value as a pasture and not as a hay crop. The leaf growth of blue grass is relatively small when viewed from the standpoint of the hay crop. On the other hand, it is one of the best grasses of the entire list.

PEANUT VINE (Field Cured Hay)—This belongs to the same family of plants as clover and alfalfa and it is therefore relatively rich in flesh-forming material. It is so low growing in its habits that it is difficult to harvest and is therefore not a practical hay crop.

SOME SELECT RATIONS FOR DAIRY COWS

No. 1—Corn ensilage, 30 pounds; clover hay, 10 pounds; bran, 3 pounds; corn, 6 pounds; oil meal, 2 pounds.

No. 2—Clover hay, 21 pounds; corn, 5 pounds; bran or ground oats, 4 pounds.

No. 3—Alfalfa or cowpea hay, 12 pounds; corn fodder, 8 pounds; corn, 8 pounds; wheat bran, 2 pounds.

No. 4—Alfalfa hay, 20 pounds; corn, 10 pounds; oilmeal, 1 pound.

No. 5—Roots, such as mangels or sugar beets, 30 pounds; corn fodder, 10 pounds; clover or alfalfa hay, 5 pounds; wheat bran, 2 pounds; corn, 2 pounds; gluten meal, 1 pound.

No. 6—Corn ensilage, 30 pounds; clover hay, 10 pounds; wheat bran, 4 pounds; Brewer's grains, 4 pounds.

SOME SELECT RATIONS FOR BEEF CATTLE

No. 1—Corn Ensilage, 35 pounds; clover hay, 4 pounds; corn, 13 pounds; cotton seed meal, 2 pounds.

No. 2—Ensilage, 40 pounds; oat straw, 8 pounds; corn, 10 pounds; meal, 3 pounds.

No. 3—Alfalfa hay, 15 pounds; corn, 12 pounds; oat straw, 5 pounds.

No. 4—Clover hay, 10 pounds; shelled corn, 22 pounds; cottonseed meal, 3 pounds.

No. 5—Alfalfa meal, 12 pounds; mangels, 25 pounds; corn, 8 pounds; oat or barley straw, 4 pounds.

Feeding Standards for Different Farm Animals

ACCORDING TO U. S. DEPARTMENT OF AGRICULTURE

Farmers Bulletin Number 22

The feeding standards prepared by Wolff, a German investigator in animal nutrition, have been the most widely used. Wolff's standards have recently been modified by Prof. E. Lehmann, as the result of additional experience and also in the attempt to adapt them more closely to the practical needs of animals. These standards are as follows:

WOLFF-LEHMANN FEEDING STANDARDS

(Showing amounts of nutrients per 1,000 pounds live weight for a day's feeding)

Animal	Total Dry Matter	Digestible Nutrients			Fuel Value
		Protein	Carbo-hydrates	Fat	
	Lbs.	Lbs.	Lbs.	Lbs.	Calories
Fattening Cattle					
First Period.....	30	2.5	15.0	0.5	34.650
Second Period.....	30	3.0	14.5	0.7	35.500
Third Period.....	26	2.7	15.0	0.7	35.900
Milch Cows					
Giving 11 pounds of milk a day.....	25	1.6	10.0	0.3	22.850
Giving 16½ pounds of milk a day.....	27	2.0	11.0	0.4	25.850
Giving 22 pounds of milk a day.....	29	2.5	13.0	0.5	30.950
Giving 27½ pounds of milk a day.....	32	3.3	13.0	0.8	33.700
Sheep:					
Coarse wool.....	20	1.2	10.5	0.2	22.600
Fine wool.....	23	1.5	12.0	0.3	26.400
Breeding ewes with lambs.....	25	2.9	15.0	0.5	35.400
Fattening Sheep:					
First period.....	30	3.0	15.0	0.5	35.600
Second period.....	28	3.5	14.5	0.6	36.000
Horses:					
Light work.....	20	1.5	9.5	0.4	22.150
Medium work.....	24	2.0	11.0	0.6	26.700
Heavy work.....	26	2.5	13.3	0.8	32.750
Brood sows	22	2.5	15.5	0.4	35.170
Fattening Swine:					
First period.....	36	4.5	25.0	0.7	57.800
Second period.....	32	4.0	24.0	0.5	54.200
Third period.....	25	2.7	18.0	0.4	40.200
Growing Cattle:					
Dairy Breeds:					
2 to 3 months old weighing about 150 pounds.....	23	4.0	13.0	2.0	40.050
3 to 6 months old weighing about 300 pounds.....	24	3.0	12.8	1.0	33.600
6 to 12 months old weighing about 500 pounds.....	27	2.0	12.5	0.5	29.100
12 to 18 months old, weighing about 700 pounds.....	26	1.8	12.5	0.4	28.300
18 to 24 months old, weighing about 900 pounds.....	26	1.5	12.0	0.3	26.350
Beef Breeds:					
2 to 3 months old, weighing about 160 pounds.....	23	4.2	13.0	2.0	40.450
3 to 6 months old, weighing about 330 pounds.....	24	3.5	12.8	1.5	36.650
6 to 12 months old, weighing about 550 pounds.....	25	2.5	13.2	0.7	32.150
12 to 18 months old, weighing about 750 pounds.....	24	2.0	12.5	0.5	29.100
18 to 24 months old, weighing about 950 pounds.....	24	1.8	12.0	0.4	27.350
Growing Sheep:					
Wool Breeds:					
4 to 6 months old, weighing about 60 pounds.....	25	3.4	15.4	0.7	37.900
6 to 8 months old, weighing about 75 pounds.....	25	2.8	13.8	0.6	33.400
8 to 11 months old, weighing about 80 pounds.....	23	2.1	11.5	0.5	27.400
11 to 15 months old, weighing about 90 pounds.....	22	1.8	11.2	0.4	25.850
15 to 20 months old, weighing about 100 pounds.....	22	1.5	10.8	0.3	24.150
Mutton Breeds:					
4 to 6 months old, weighing about 60 pounds.....	26	4.4	15.5	0.9	40.800
6 to 8 months old, weighing about 80 pounds.....	26	3.5	15.0	0.7	37.350
8 to 11 months old, weighing about 100 pounds.....	24	3.0	14.3	0.5	34.300
11 to 15 months old, weighing about 120 pounds.....	23	2.2	12.6	0.5	29.650
15 to 20 months old, weighing about 150 pounds.....	22	2.0	12.0	0.4	27.750
Growing Swine:					
Breeding Stock:					
2 to 3 months old, weighing about 50 pounds.....	44	7.6	28.0	1.0	70.450
3 to 5 months old, weighing about 100 pounds.....	35	5.0	23.1	0.8	55.650
5 to 6 months old, weighing about 120 pounds.....	32	3.7	21.3	0.4	48.190
6 to 8 months old, weighing about 200 pounds.....	28	2.8	18.7	0.3	41.250
8 to 12 months old, weighing about 250 pounds.....	25	2.1	15.3	0.2	33.200
Fattening Stock:					
2 to 3 months old, weighing about 50 pounds.....	44	7.6	28.0	1.0	70.450
3 to 5 months old, weighing about 100 pounds.....	35	5.0	23.0	0.8	55.650
5 to 6 months old, weighing about 150 pounds.....	33	4.3	22.3	0.6	52.000
6 to 8 months old, weighing about 200 pounds.....	30	3.6	20.5	0.4	46.500
9 to 12 months old, weighing about 275 pounds.....	26	3.0	18.3	0.3	40.900

NOTE.—The "Calorie" is the amount of heat required to raise 1 kilogram of water 1 degree of the Centigrade thermometer; or, approximately 1 pound of water 4 degrees Fahrenheit.

Average Crude Contents of These Feeds

Average
Digestible
Yield
per 100
lbs.Protein
Carbohyd.
Fat
Calories

Heat Units

SOY BEAN SILAGE	COW PEA HAY FIELD CURED	SUNFLOWER HEADS & SEEDS	SUNFLOWER SEED	MANGEL-WURZELS	RUTABAGAS	PUMPKINS	CACTUS-SPINELESS	SKIM MILK SEPARATOR	BUTTERMILK
WATER 74.2	WATER 7.43	WATER 75.6	WATER 8.6	WATER 91.0	WATER 88.6	WATER 90.9	WATER 88.0	WATER 90.6	WATER 91.0
ASH 2.8	ASH 12.70	ASH 1.2	ASH 2.6	ASH 1.0	ASH 1.0	ASH 0.5	ASH 0.6	ASH 0.7	ASH 0.7
PROTEIN 5.1	PROTEIN 13.63	PROTEIN 1.3	PROTEIN 16.3	PROTEIN 1.0	PROTEIN 1.0	PROTEIN 0.5	PROTEIN 0.6	PROTEIN 3.2	PROTEIN 3.0
NITR. FREE EXTR. 0.9	NITROGEN FREE EXT. 43.00	NITR. FREE EXTR. 7.8	NITROGEN FREE EXT. 21.4	NITR. FREE EXTR. 6.4	NITR. FREE EXTR. 7.5	NITR. FREE EXTR. 6.2	NITR. FREE EXTR. 6.3	NIT. F. EXT. 5.2	NIT. F. EXT. 4.8
FIBER 9.7	FIBER 21.89	FIBER 7.9	FIBER 29.9	FIBER 1.0	FIBER 0.2	FIBER 0.3	FIBER 0.3	FAT 0.3	FAT 0.3
FAT 2.2	FAT 1.49	FAT 4.9	FAT 21.2	FAT 0.1	FAT 0.1	FAT 0.1	FAT 0.1	FAT 0.30	FAT 0.50
Pounds 2.8	Pounds 8.9	Not Ascertained	Not Ascertained	Pounds 1.03	Pounds 0.9	Pounds 0.9	Pounds 0.9	Pounds 3.01	Pounds 2.82
11.8	40.0	Not Ascertained	Not Ascertained	5.65	7.8	Not Ascertained	Not Ascertained	5.10	4.70
0.6	0.7	Not Ascertained	Not Ascertained	0.11	0.1	Not Ascertained	Not Ascertained	0.30	0.50
29.833	93.908	Not Ascertained	Not Ascertained	12.888	15.497	Not Ascertained	Not Ascertained	16.351	16.097

SOY BEAN SILAGE—Where this material has been put into the silo while it is green and thoroughly tramped so as to exclude air, it makes a valuable product. Usually, however, it is not put in the silo alone, but is mixed with green corn and in that case the product keeps much better and it is valuable for dairy cows and for fattening steers. The Soy Bean belongs to the Legume family and it is therefore flesh-forming in character and a very common practice is to sow the bean along with corn so that the two crops are cut at the same time and converted into ensilage.

COW PEA HAY (Field Cured)—One of the richest of the entire list of hays. Great care must be taken after cutting the green crop in order to prevent the loss of leaves, because these contain the elements of greatest feeding value. It is never advisable to dry it out in windrows, it being much better to put it in shocks soon after cutting so that the product will cure out without the loss of valuable feeding elements. Cow Pea Hay is especially adapted to the needs of dairy cows and will give good results if fed to fattening steers.

SUN FLOWER SEED—This crop thrives under the same climatic conditions as corn and it is possible to obtain a yield of one ton of seed per acre. The crop is somewhat difficult to harvest and for that reason the seed is used mainly as poultry food. If used for cattle or hogs the food should be ground or soaked. In recent years considerable success has been attained in converting the sun flower plant into ensilage, thus solving the problem of utilizing the seed for stock feeding purposes. The seed contains a high percentage of oil and it is therefore sometimes used as a laxative when compounded with such grain as oats and corn.

MANGEL-WURZELS—A valuable root crop that may be fed during the entire winter period. It is well adapted to the needs of dairy cows, stock cattle and even hogs. It is quite watery in its nature so that considerable grain must be fed in conjunction with it. The crop is extensively used as a food for dairy cows because, like some other roots, it does not taint the milk. On a rich soil mangel-wurzels will yield as much as 20 or even 30 tons per acre. They must be stored in cold climates so as to prevent freezing; otherwise they very rapidly deteriorate.

RUTABAGAS—This crop is the main standby of the stockmen of the British Isles and its use has played an important part in the production of the principal breeds of live stock in that country. Rutabagas are exceedingly well adapted to the needs of breeding animals of all kinds and especially to young stock. Although the roots contain nearly 90 per cent of moisture, still the crop keeps well when properly stored and it may be kept for a period of six or even eight months after harvesting. A mature bovine will consume as much as 50 pounds of rutabagas in a day. For best results grain should be fed in connection with these roots.

PUMPKINS—May be used in unlimited quantities for dairy cows and for hogs. They supply a comparatively small proportion of flesh-building materials and pumpkins are valued mainly because of their beneficial action upon the digestive system. In the Central West pumpkins are mainly produced in cornfields and a popular practice is to hog down the corn crop and consume the pumpkins fresh from the vines. In this way the labor of harvesting is avoided. Pumpkins do not keep well and ought to be fed before freezing weather begins.

Average Crude Contents of These Feeds

Average
Digestible
Yield
per 100
lbs.Protein
Carbohyd.
Fat

Calories

Heat Units

OAT STRAW	ALFALFA GREEN FODDER	SORGHUM GREEN FODDER	KAFIR CORN* CHOP	MILO CHOP* WHOLE PLANT	FETERITA*	PEANUT VINE FIELD CURED HAY	PEANUT CAKE	ALFALFA HAY FIELD CURED	SOY BEAN MEAL
WATER 9.2	WATER 71.8	WATER 79.4	WATER 15.33	WATER 10.74	WATER 10.82	WATER 7.6	WATER 10.7	WATER 8.81	WATER 10.2
ASH 5.1	ASH 1.2	ASH 1.2	ASH 1.43	ASH 1.44	ASH 1.48	ASH 10.8	ASH 4.9	ASH 9.07	ASH 5.0
PROTEIN 4.0	PROTEIN 4.0	PROTEIN 4.0	PROTEIN 12.81	PROTEIN 10.94	PROTEIN 11.83	PROTEIN 10.7	PROTEIN 47.6	PROTEIN 16.38	PROTEIN 35.9
NITROGEN FREE EXT. 42.4	NITROGEN FREE EXT. 42.4	NITROGEN FREE EXT. 42.4	NITROGEN FREE EXT. 64.30	NITROGEN FREE EXT. 73.22	NITROGEN FREE EXT. 71.71	NITROGEN FREE EXT. 42.7	NITROGEN FREE EXT. 23.7	NITROGEN FREE EXT. 37.40	NITROGEN FREE EXT. 28.0
FIBER 37.0	FIBER 7.4	FIBER 6.1	FIBER 2.03	FIBER 1.43	FIBER 1.16	FIBER 23.6	FIBER 5.1	FIBER 26.45	FIBER 3.4
FAT 2.3	FAT 1.0	FAT 0.6	FAT 4.04	FAT 2.32	FAT 8.34	FAT 4.6	FAT 8.0	FAT 1.89	FAT 17.5
Pounds 0.2	Pounds 3.9	Pounds 4.1	Pounds 7.8	Pounds 10.17	Pounds 6.7	Pounds 6.7	Pounds 14.1	Pounds 10.6	Pounds 10.6
38.6	11.2	48.2	57.1	66.80	Not Ascertained	42.2	31.3	38.9	Not Ascertained
0.8	0.4	1.6	2.1	0.86	Not Ascertained	3.0	5.8	0.9	Not Ascertained
75.544	29.798	119.434	129.576	146.793	103.614	114.112	95.868	Not Ascertained	Not Ascertained

ALFALFA HAY—A legume rich in flesh-forming material and therefore an excellent food for dairy cows, for fattening cattle and for work horses. When cut early and well cured it can be used to advantage in feeding brood sows during the winter months. It is practically as rich as bran in flesh-forming materials and it may be largely used to take the place of high-priced grain in the ration. In some cases it is used for work horses, but causes a slight tendency to scouring, and it therefore must be fed with moderation.

ALFALFA (GREEN FODDER)—This is in reality nothing more nor less than alfalfa pasture. A very rich legume primarily adapted to hogs as a pasture, though to all classes of stock when cured into hay. In some instances green alfalfa is placed in the silo after being run through an ensilage cutter. It must be well wetted down and tramped with great diligence; otherwise it will overheat and spoil. There is always risk of spoiling the crop when it is ensiled alone. The danger of spoiling is not great, however, when it is mixed with corn, because this is a crop of greater weight. Cattle and sheep should never be pastured on alfalfa, as it is apt to cause bloat. It is not so dangerous for horses, as they are not apt to gorge themselves, but high-priced animals, excepting hogs, should be kept out of alfalfa fields.

KAFIR CORN CHOP—This grain is somewhat richer than corn in flesh-forming material and is therefore a better balanced ration. Economical gains may be made from kafir corn chop when it is fed to fattening steers and it will produce pork economically if it can be purchased at a reasonable price. Its use means that very little concentrated food like oil meal or tankage will have to be used in conjunction with it, though it is advantageous to use clover or alfalfa hay for roughage along with this grain. As the name implies, it is nothing more nor less than ground kafir corn, the product originally being too hard for use. The cost of grinding is more than made up in the additional gains that will be made from the use of chop as compared with whole grain.

MILO CHOP—A product much resembling kafir corn chop, though not so rich in flesh-forming material. It is palatable and is well adapted for fattening purposes when fed to hogs or steers. When used for dairy cows it must be fed in conjunction with cottonseed meal or oil meal; otherwise the cows will tend to fatten rather than to produce milk. Care must be taken in grinding it; otherwise a floury product will be produced and compaction of the stomach in farm animals is apt to result from the heavy feeding of such materials. Where it is used extensively such forms of roughage as clover and alfalfa hay should be fed with it, as these supply materials that are lacking in the milo chop.

SORGHUM (GREEN FODDER)—An exceedingly palatable fodder, particularly so if the crop has been allowed to approach maturity. The stalk is sweet so that there is no waste in feeding it to dairy cows, to horses or to fattening steers. Where sorghum is seeded thinly and the stalks allowed to attain considerable size the product may be used for brood sows during the winter. In feeding it bear in mind that it is a one-sided fodder, lacking in flesh-forming material. In the case of fattening steers or dairy cows it should be used in conjunction with cottonseed meal or oil meal, whereas in the case of hogs a small amount of tankage or oil meal should be fed daily where sorghum fodder is used heavily. The crop is usually cured out in large shocks and left in the field until it is required for feeding purposes. This causes some waste from bleaching on the surface, so that there is some advantage in putting it in a mow or stack. Curing in the shock is a long process, requiring possibly three or four weeks. It should be fairly well dried out before storing; otherwise it may overheat and become fire fanged.

OAT STRAW—More palatable than the straw of any other cereal and can be fed to advantage to idle horses as well as to stock cattle. It is a satisfactory food to use in conjunction with clover or alfalfa hay for fattening cattle. Where the oat crop has been badly rusted it should not be fed in very large quantities to brood animals.

FETERITA—Experiment stations have done little work to determine the value of this grain, as the crop so far has largely been used for fodder purposes. The grain is richer than corn in materials used in the building up of flesh and bone. When the grain is well matured it is highly palatable, but must be ground or soaked before feeding on account of the extreme hardness of the hull.

RICE HULLS—These are very woody in their nature and could only be used for feeding purposes as a last resort. In no sense could this product be considered a grain, but would be classed as a form of roughage, to be compared with such low grade feeding materials as rye straw, wheat straw and threshed timothy straw. Animals forced to consume large proportions of rice hulls would be liable to contract such ailments as impaction of the stomach and the derangement of the whole digestive system.

MILLET—Hungarian (Green Forage)—This is sometimes used for dairy cows when they are stabled or yarded during the late summer and fall months. In that case a small amount is cut daily and it makes a fairly good form of roughage. It can only be used in this way for any length of time when a small strip has been seeded at intervals of one week or ten days; otherwise the product will soon become woody and unfit for feeding. It is quite watery when cut early and it therefore cannot be kept over without spoiling for more than one or two days.

ALFALFA MEAL—This is nothing more or less than ground alfalfa hay. If it is free from weeds it is a very satisfactory product for calves, for brood sows, for dairy cows and even for fattening steers. It is rich in flesh-forming material and its use in large quantities will take the place of the rich high-priced meals. In many cases the meal is mixed with molasses and the resulting product is exceedingly palatable and will be consumed readily by all classes of farm animals. No special advantage is derived from grinding, this being necessary only to bring the product into a convenient form for shipping. It is used extensively by men who handle pure-bred cattle, as it is a safe feed and it can scarcely be fed in injurious quantities.

BREWER'S GRAIN—This is unquestionably one of the very best foods for dairy cows, as it is exceedingly palatable and rich in ingredients needed for milk production. When fed wet thirty pounds will constitute a good daily ration for a cow weighing 1,000. Even the dry product is very palatable and is used in balancing a ration. A heavy producing cow will require at least four pounds daily of the dry grain and, in addition, enough other grain to make a total ranging from ten to fifteen pounds, the exact amount depending upon the productive capacity of each individual cow.

RYE—GREEN (FORAGE)—This crop can be used to advantage as a pasture for hogs and cattle and where it is intended for this purpose it is always seeded in the fall. In localities where there is but little snowfall it makes a good winter pasture, and as it is very hardy it seldom winter kills. After pasturing freely for a month or six weeks in the spring the crop will make rapid growth and after it is headed out it may be cut and cured as a hay crop, or allowed to mature to be harvested as grain.

COTTONSEED HULLS—May be used to advantage in steer feeding and for dairy cows where the product can be purchased at a low price. It is primarily a roughage and cannot take the place of grain. It does not have the feeding equivalent of oat straw and therefore must be used in conjunction with richer foods like cottonseed meal, corn or oil meal.

MILLET HAY (Hungarian)—If millet is cut for hay purposes soon after it heads out the resulting product will be fairly palatable and it will make a form of roughage that is reasonably well adapted to the needs of farm animals. It is better adapted to young stock and to idle work horses than it is to fattening animals or milk cows. If for any reason the cutting of the millet crop has been delayed until the seed becomes hard, there is danger that the hay will be injurious when fed to horses, as it acts unfavorably on the kidneys. This is not the case if the crop is cut early and well cured. Where millet hay is used extensively for farm animals it will be necessary to purchase some of the richer grains, such as oil meal or cottonseed meal, to use with it.

SALT MARSH HAY—In most cases this product is more or less unpalatable, unless cut early and well cured. If it is allowed to bleach out in the sun during the curing process, its value will be greatly impaired, and therefore the best results are obtained when it is cut early—placed in the shock the following day and allowed to remain there until dry enough to store in the mow or stack.

POULTRY FOOD (Ordinary Mixed)—The exact character of this depends upon the proportion of the different grains used. Where corn predominates it will tend to fatten poultry, whereas if wheat predominates the food will be especially adapted to laying hens. Sometimes such materials as millet and cane seed are used and in that case the tendency will be to make the resultant product a fattening material.

SOY BEAN MEAL—A rich grain that must be fed in supplementary quantities only. One part of soy bean meal and eight parts of corn make almost a perfect ration for fattening steers if it is fed in conjunction with clover or alfalfa hay. For dairy cows a larger proportion of the meal should be used, say one part to six parts of corn. Grinding or soaking is always a necessity, as the grain is too hard to be fed whole.

BUTTERMILK—The composition of this product is very similar to skim milk and therefore its feeding value is very much the same. Like skim milk, it cannot advantageously be fed to calves, but it is well adapted to the needs of young pigs to fattening swine and to brood sows. In any case, the animals must become accustomed to it gradually, otherwise it is apt to be injurious. Its value will range all the way from 10c to 35c per 100 pounds, depending upon the price of grain. Souring impairs the feeding value of the buttermilk very slightly, consequently it may be fed any time within two or three days after it leaves the churn.

CACTUS—Spineless—This product has not come into general use and its feeding value has not yet been determined by the experiment stations. It is watery in its nature and very low in flesh-forming ingredients.

LINSEED MEAL—An exceedingly palatable product that is used in compounding a ration for dairy cows, fattening steers and fattening hogs. Its richness in flesh-forming material makes it well adapted to the needs of young, growing animals. For example, it may be fed in conjunction with corn to young pigs in the proportion of one of the former to eight or ten of the latter. It is a mild laxative and seems to aid in the digestion of other foods. If it is fed to horses it must be used sparingly; first, because of its laxative effect, and, secondly, it becomes unpalatable sooner or later if fed too liberally.

SKIM MILK (Separator)—This material is used extensively in feeding young pigs and calves. It is lacking in fat-forming material and must therefore be supplemented with grain. Corn and skim milk when fed together make an excellent combination for calves. A calf will consume anywhere from twelve to twenty pounds of skim milk per day, but the product should be fed warm. It is unwise to feed it after it has become soured, particularly when it is used for calves. It is an excellent product to use in mixing foods for hogs, as it adds palatability to all materials with which it is mixed. In any case, animals must be accustomed to it gradually, otherwise it is apt to cause scouring.

RICE GRAIN—This product is seldom used for stock feeding purposes because it is very low in protein or flesh-forming material and, secondly, it is usually so high in price as to take it out of the list of animal foods. Where fed to dairy cows liberal quantities of oil meal or cottonseed meal would have to be supplied in order to make a ration suitable for milk production.

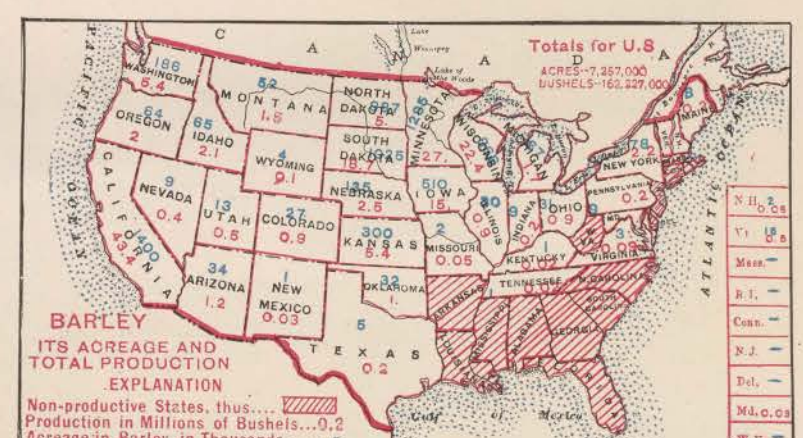
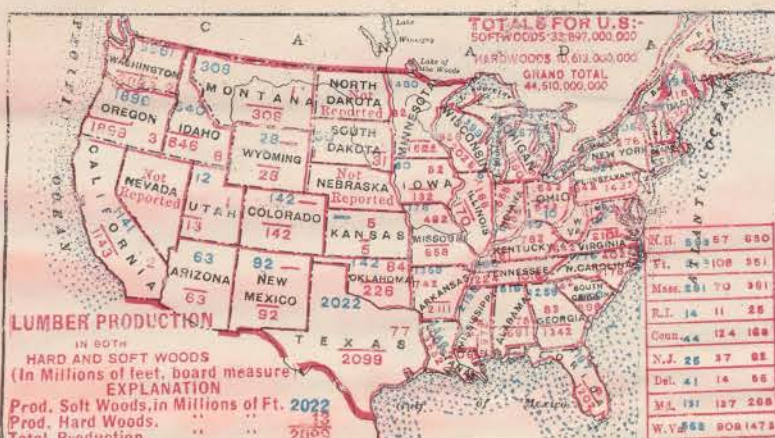
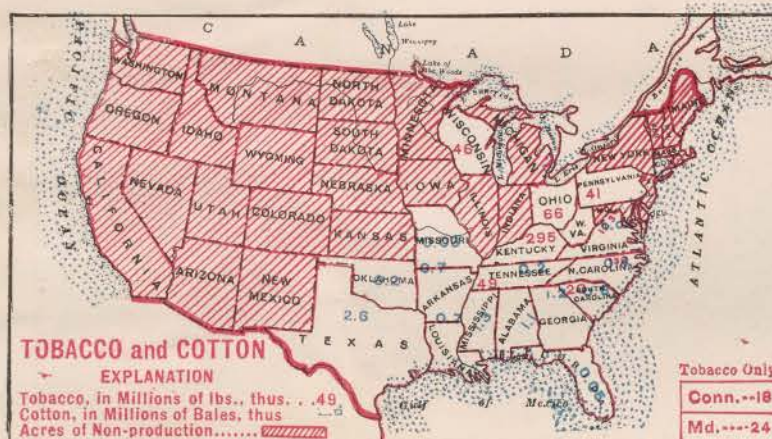
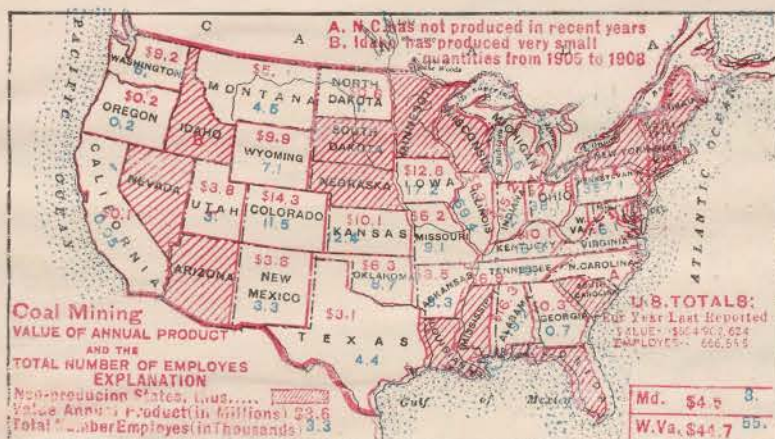
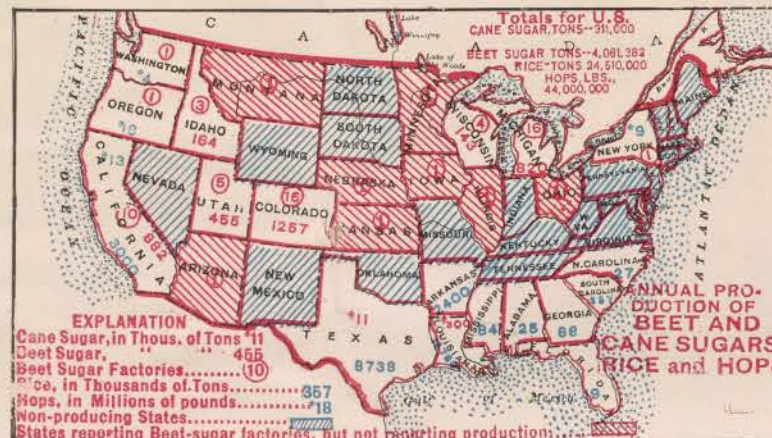
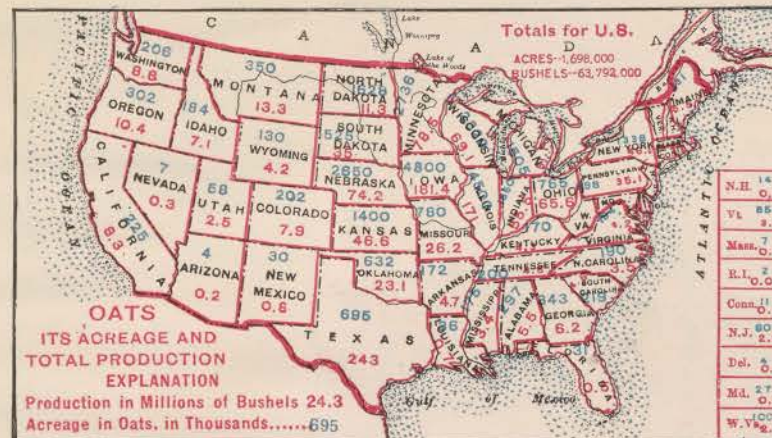
HAY—Average Mixed—In the ordinary sense of the term this usually refers to a combination of clover and timothy and the mixture may be used to great advantage in feeding all classes of stock. Where clover predominates the product will be adapted to the needs of dairy cows, fattening steers, ewes and lambs, while, on the other hand, where timothy predominates the product will be better adapted to the needs of the work horse and to idle horses. These crops do not mature at the same time and the cutting must be done while the timothy is still tender and the red clover heads beginning to turn brown. If cutting is delayed beyond this point there will be loss of clover leaves, and this constitutes the most valuable part of the crop. To determine the time of cutting one must go entirely by the condition of the clover and not the timothy.

OATS—GREEN (FORAGE)—When the oat crop is cut just as the kernels are turning into the dough condition it makes a valuable forage crop. Ordinarily it is cut with a binder and cured out in the shock. When cared for in this way it is easily handled and is in exceedingly convenient form for feeding purposes. It is rich enough in feeding elements so that horses are often wintered on this food alone. It may be fed to dairy cows to great advantage and where it is used with the richer and more expensive part of the ration may be cut down. This means that such products as cottonseed meal and oil meal can be fed in less quantities where oat forage is used than would be the case if timothy hay were fed.

COTTONSEED CAKE—This is nothing more or less than the unground cottonseed meal and it is therefore of the same composition and can be used in the same way as cottonseed meal when broken up into small particles. The presence of this product on the market in the form of cake means that it has been left in this form for convenience in shipping.

VALUABLE STATISTICS ON LEADING FARM ANIMALS and PRODUCTS

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The World's Leading Grain Crops

Corn Crop of Countries Named, 1912-1914

Country	Area			Production		
	1912	1913	1914	1912	1913	1914
	Acres	Acres	Acres	Bushels	Bushels	Bushels
North America						
United States.....	107,083	105,820	103,435	3,124,746	2,446,988	2,672,804
Canada.....	298	278	256	16,950	16,773	13,924
Mexico.....	13,375			190,000	190,000	190,000
Total No. A.				3,331,696	2,653,761	2,876,728
South America						
Argentina.....	8,456	9,464	10,260	295,849	196,642	263,135
Chile.....	56	65	59	1,527	1,647	1,505
Uruguay.....	591	629		7,963	5,343	
Total So. A.	9,103	10,158		305,339	203,632	
Europe						
Austria-Hungary.....	8,388	8,723		224,373	231,869	
Bulgaria.....	1,579	1,404		28,475	32,000	31,000
France.....	1,177	1,020	1,141	23,733	21,455	22,000
Italy.....	3,938	3,888	3,680	98,668	108,388	105,000
Portugal.....				15,000	15,000	15,000
Roumania.....	5,104	5,305	4,942	103,921	114,662	110,230
Russia.....	4,055	4,210	3,893	79,608	72,793	80,608
Servia.....	1,446	1,445		22,833	23,621	20,000
Spain.....	1,149	1,105	1,137	25,069	25,140	30,325
Total, Europe				621,680	644,928	
Asia						
British India.....	5,591	6,157	4,847		87,240	64,800
Japan.....	136	133	141		3,802	3,559
Philippine Islands.....	840	988			7,810	10,224
Total, Asia						
Africa						
Algeria.....	31	24			374	394
Egypt.....	1,903	1,923			60,857	57,044
Union of So. Africa.....					30,830	30,830
Total, Africa					92,061	88,268
Australasia						
Australia:						
Queensland.....	154	118	157		3,752	2,604
New South Wales.....	168	177	162		4,649	5,273
Victoria.....	18	20	18		818	738
Western Australia.....					1	
South Australia.....					2	4
Total, Australia	340	315	337		9,222	8,619
New Zealand.....	6	5	6		278	222
Total, Australasia	346	320			9,500	8,841
Grand Total				4,371,888	3,613,213	

Add 000 to all figures in this table.

Rye Crop of Countries Named, 1912-1914

Country	Area			Production		
	1912	1913	1914	1912	1913	1914
	Acres	Acres	Acres	Bushels	Bushels	Bushels
North America						
United States.....	2,117	2,557	2,541	35,664	41,381	42,779
Canada:						
Quebec.....	11	10	9	173	156	156
Ontario.....	93	85	78	1,711	1,567	1,341
Manitoba.....	5	5	5	105	103	100
Saskatchewan.....	3	3	3	57	68	54
Alberta.....	15	16	16	377	398	360
Other.....				5	8	6
Total, Canada	127	119	111	2,428	2,300	2,017
Mexico				70	70	70
Total, No. A.				38,162	43,751	44,866
Europe						
Austria-Hungary.....	7,910	7,752		170,420	164,529	145,203
Belgium.....	650	641	645	21,312	22,463	21,000
Bulgaria.....	529	457		8,422	10,826	9,842
Denmark.....	607			16,083	16,637	17,000
Finland.....				12,344	10,289	10,806
France.....	2,969	2,905	2,914	48,890	49,452	50,000
Germany.....	15,489	15,849	16,057	456,600	481,169	440,000
Italy.....	305	307	304	5,285	5,589	5,260
Netherlands.....	564	562	560	16,094	16,895	14,635
Norway.....	37			1,041	973	1,046
Roumania.....	265	224	208	3,583	3,711	1,959
Russia (European).....	70,795	71,878	71,636	1,010,986	962,362	870,000
Servia.....	123	74		1,748	937	1,000
Spain.....	1,944	1,917	1,887	18,867	27,916	23,950
Sweden.....	989			23,323	22,266	27,599
United Kingdom.....	68	64	67	1,500	1,750	1,800
Total Europe				1,816,498	1,797,764	1,641,100
South America						
Argentina.....	38	99	227	482	1,417	3,346
Chile.....	6	7		140	147	140
Uruguay.....				1	2	1
Total, So. A.				623	1,566	3,487
Asia						
Russia:						
Central Asia.....	104			1,117		
Siberia.....	2,279			29,955		
Transcaucasia.....	2			14		
Total Russia (Asiatic)	2,385	3,112		31,086	30,706	39,982
Australasia						
Australia:						
Queensland.....					2	
New So. Wales.....	2	3		26	42	
Victoria.....	1	1		10	18	
So. Australia.....	1	1		7	10	
Western Australia.....	1	1		3	4	
Tasmania.....	1	1		12	20	
Total, Australia	6	7		58	96	100
New Zealand.....	6			90	90	90
Total, Australasia	12			148	186	190
Grand Total				1,886,517	1,873,973	1,729,625

Add 000 to all figures in this table.

Total Production of Wheat in the World, 1891-1914

Year	Production	Year	Production	Year	Production	Year	Production
	Bushels		Bushels		Bushels		Bushels
1891...	2,432,322	1897...	2,236,268	1903...	3,189,813	1909...	3,581,519
1892...	2,481,805	1898...	2,948,305	1904...	3,163,542	1910...	3,575,055
1893...	2,559,174	1899...	2,783,885	1905...	3,327,084	1911...	3,551,735
1894...	2,660,557	1900...	2,640,751	1906...	3,434,354	1912...	3,791,875
1895...	2,593,312	1901...	2,955,975	1907...	3,133,965	1913...	4,124,900
1896...	2,506,320	1902...	3,090,116	1908...	3,182,105	1914...	3,724,535

Add 000 to all figures in this table.

Total Production of Corn in the World, 1894-1914

Year	Production	Year	Production	Year	Production	Year	Production
	Bushels		Bushels		Bushels		Bushels
1894...	1,671,307	1899...	2,724,100	1904...	3,109,252	1909...	3,563,226
1895...	2,834,750	1900...	2,792,561	1905...	3,461,181	1910...	4,031,630
1896...	2,964,435	1901...	2,306,583	1906...	3,963,645	1911...	2,481,007
1897...	2,537,206	1902...	3,157,311	1907...	3,420,321	1912...	4,369,742
1898...	2,682,619	1903...	3,066,506	1908...	3,606,931	1913...	3,605,422
				1914...		1914...	2,672,804

Add 000 to all figures in this table.

Total Production of Oats in the World, 1895-1914

Year	Production	Year	Production	Year	Production	Year	Production
	Bushels		Bushels		Bushels		Bushels
1895...	3,008,154	1900...	3,166,002	1905...	3,510,167	1910...	4,182,410
1896...	2,847,115	1901...	2,862,615	1906...	3,544,961	1911...	3,808,561
1897...	2,633,971	1902...	3,626,303	1907...	3,603,896	1912...	4,608,506
1898...	2,903,974	1903...	3,378,034	1908...	3,591,012	1913...	4,631,166
1899...	3,256,256	1904...	3,611,302	1909...	4,312,882	1914...	4,171,508

Add 000 to all figures in this table.

Total Production of Rye in the World, 1895-1914

Year	Production	Year	Production	Year	Production	Year	Production
	Bushels		Bushels		Bushels		Bushels
1895...	1,468,212	1900...	1,557,634	1905...	1,495,751	1910...	1,673,473
1896...	1,499,250	1901...	1,416,022	1906...	1,433,395	1911...	1,573,933
1897...	1,300,645	1902...	1,647,845	1907...	1,538,778	1912...	1,889,594
1898...	1,461,171	1903...	1,659,961	1908...	1,590,057	1913...	1,885,147
1899...	1,583,179	1904...	1,742,112	1909...	1,747,123	1914...	1,729,625

Add 000 to all figures in this table.

Total Production of Rice in the World, 1900-1913

Year	Production	Year	Production
	Pounds		Pounds
1900...	91,584,400,000	1907...	105,354,132,000
1901...	99,445,600,000	1908...	106,662,842,000
1902...	106,626,400,000	1909...	131,660,408,000
1903...	110,865,000,000	1910...	130,214,621,000
1904...	115,735,800,000	1911...	92,149,717,000
1905...	108,963,551,000	1912...	87,669,557,000
1906...	112,363,176,000	1913...	

Total Production of Cotton in the World, 1900-1914

Year	Production	Year	Production	Year	Production	Year	Production
	Bales		Bales		Bales		Bales
1900...	15,893,591	1904...	21,005,175	1907...	18,328,613	1910...	22,433,269
1901...	15,926,048	1905...	18,342,075	1908...	3,688,292	1911...	25,649,644
1902...	17,331,503	1906...	22,183,148	1909...	20,679,334	1912...	24,696,767
1903...	17,278,881					1913...	20,134,120
						1914...	21,790,498

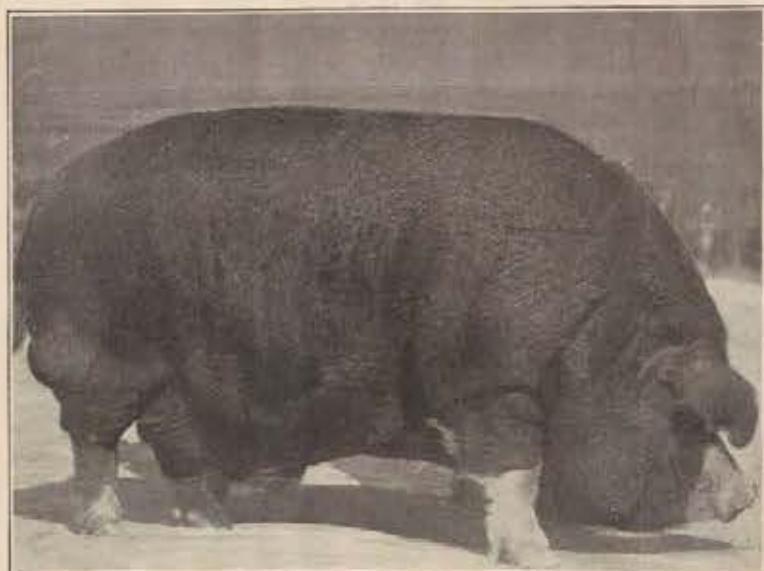
The World's Leading Grain Crops---Continued

Oat Crop of Countries Named, 1912-1914						
Country	Area			Production		
	1912	1913	1914	1912	1913	1914
North America	Acres	Acres	Acres	Bushels	Bushels	Bushels
United States.....	37,917	38,399	38,442	1,418,337	1,121,768	1,141,060
Canada:						
New Brunswick.....	195	195	200	5,607	5,046	6,488
Quebec.....	1,296	1,303	1,327	33,516	39,025	42,119
Ontario.....	2,785	2,814	2,840	97,059	105,150	99,400
Manitoba.....	1,348	1,398	1,331	57,154	56,759	31,951
Saskatchewan.....	2,556	2,755	2,520	117,537	114,112	61,816
Alberta.....	1,461	1,639	1,503	67,630	71,542	57,070
Other.....	325	330	341	13,132	12,126	14,228
Total, Canada.....	9,966	10,434	10,061	391,629	404,669	313,078
Mexico.....				17	17	17
Total No. A.....				1,809,983	1,526,454	1,454,155
South America						
Argentina.....	2,548	2,946	3,087	69,169	75,783	50,981
Chile.....	69	94		3,380	4,443	4,000
Uruguay.....	86	50	97	1,825	872	1,850
Total So. A.....				74,374	81,098	56,831
Europe						
Austria-Hungary.....	7,528	8,146		231,221	270,834	247,568
Belgium.....	648	671	686	35,086	47,957	49,742
Bulgaria.....	435	400		8,707	8,000	8,000
Denmark.....	1,059			44,868	46,755	48,000
Finland.....				26,618	22,924	18,678
France.....	9,840	9,833	9,848	313,856	311,157	300,000
Germany.....	10,841	10,967	11,148	586,987	669,231	620,000
Italy.....	1,254	1,251	1,213	28,306	43,469	26,827
Netherlands.....	341	348	346	16,317	21,117	19,968
Norway.....	263			11,607	11,734	9,325
Roumania.....	943	1,290	1,056	20,775	35,138	25,015
Russia (European).....	41,219	42,040	42,604	973,267	1,105,592	800,000
Serbia.....	262	272		8,477	5,512	5,000
Spain.....	1,279	1,351	1,304	23,035	25,333	31,227
Sweden.....	1,952			87,766	99,815	52,527
United Kingdom:						
England.....	1,866	1,772	1,730	68,431	70,404	71,667
Wales.....	207	202	200	7,040	6,992	7,431
Scotland.....	956	938	920	37,928	37,148	38,115
Ireland.....	1,046	1,049	1,029	66,867	66,103	63,287
Total, United Kingdom.....	4,075	3,961	3,879	180,266	180,647	180,500
Total, Europe.....				2,593,959	2,905,215	2,442,397
Asia						
Cyprus.....				378	400	400
Russia, Cen. Asia.....	869			17,591	10,985	
Russia, Siberia.....	3,893			76,664	102,681	
Russia, Transcaucasia.....	2			65	75	
Total, Asia.....				94,698	120,141	162,906
Africa						
Algeria.....	476	539		12,351	17,973	13,951
Tunis.....	124	133	99	2,067	4,133	689
Union of So. Africa.....				9,661	9,661	9,661
Total, Africa.....				24,079	31,767	24,301
Australasia						
Australia:						
Queensland.....	1	4		6	85	58
New So. Wales.....	71	85		1,191	1,725	1,893
Victoria.....	302	442		4,730	8,586	9,170
South Australia.....	108	156		1,392	1,726	1,259
Western Australia.....	84	128		992	2,175	1,708
Tasmania.....	51	62		1,552	2,328	1,644
Total, Australia.....	617	877	859	9,863	16,625	15,712
New Zealand.....	404	387	362	10,438	14,013	15,206
Total, Australasia.....	1,021	1,264		20,301	30,638	30,918
Grand Total.....				4,617,394	4,695,313	4,171,508

Add 000 to all figures in this table.

Wheat Crop of Countries Named, 1912-1914						
Country	Area			Production		
	1912	1913	1914	1912	1913	1914
North America	Acres	Acres	Acres	Bushels	Bushels	Bushels
United States.....	45,814	50,184	53,541	730,267	763,380	891,017
Canada:						
New Brunswick.....	13	13	13	236	269	234
Ontario.....	855	850	834	17,421	19,851	17,658
Manitoba.....	2,839	2,804	2,619	63,017	53,331	38,605
Saskatchewan.....	5,582	5,720	5,348	106,960	121,559	73,494
Alberta.....	1,590	1,512	1,371	34,303	34,372	28,859
Other.....	118	117	111	2,222	2,335	2,430
Total, Canada.....	10,997	11,016	10,293	224,159	231,717	161,280
Mexico.....				12,000	10,000	8,000
Total, No. A.....				966,426	1,005,097	1,060,297
South America						
Argentina.....	17,042	17,096	16,242	166,190	187,391	113,904
Chile.....	1,003	1,103	1,151	22,468	23,575	11,986
Uruguay.....	799	826	911	8,757	5,461	5,887
Total So. A.....				197,415	216,427	131,777
Europe						
Austria-Hungary.....	12,942	11,834		257,347	232,193	190,655
Belgium.....	397	394	400	15,348	14,769	13,973
Bulgaria.....	2,887	2,513	2,545	44,756	40,000	36,000
Denmark.....	134			5,045	6,092	4,700
Finland.....				130	130	130
France.....	16,979	16,166	16,049	336,284	321,000	319,667
Germany.....	4,759	4,878	4,990	160,224	171,975	160,000
Greece.....				7,000	7,000	7,000
Italy.....	11,751	11,842	11,783	165,720	214,405	109,442
Montenegro.....				200	200	200
Netherlands.....	143	142	145	5,604	5,164	5,380
Norway.....	12			332	325	269
Portugal.....	1,120	1,208		6,761	9,186	10,000
Roumania.....	5,114	4,011	5,218	88,924	83,236	49,270
Russia (European).....	60,668	62,066	62,316	623,762	838,776	597,000
Serbia.....	656	573		18,351	10,324	9,000
Spain.....	9,635	9,644	9,681	109,783	112,401	116,089
Sweden.....	260	259		7,832	9,330	8,472
Switzerland.....	105	103		3,178	3,546	3,480
Turkey.....				18,000	18,000	18,000
United Kingdom:						
England.....	1,822	1,663	1,770	54,004	53,736	59,308
Wales.....	41	38	37	1,123	1,075	1,082
Scotland.....	62	55	61	2,471	2,335	2,641
Ireland.....	45	34	37	1,564	1,295	1,415
Total, United Kingdom.....	1,970	1,790	1,905	59,162	58,441	64,446
Total, Europe.....				1,631,743	2,156,393	1,783,173
Asia						
British India.....	31,141	29,524	27,609	370,515	362,693	313,040
Cyprus.....				2,176	2,100	2,000
Japanese Empire.....				26,678	26,017	21,802
Persia.....				16,000	16,000	14,000
Russia (Asiatic).....	10,668	13,102	14,689	96,280	121,042	179,960
Turkey (Asia Minor only).....				35,000	35,000	35,000
Total, Asia.....				546,649	563,752	565,802
Africa						
Algeria.....	3,614	3,448		27,172	36,848	30,000
Egypt.....	1,332	1,355		30,903	38,426	35,689
Tunis.....	1,263	1,235	1,068	4,225	5,511	2,265
Union of So. Africa.....				6,034	6,034	6,034
Total, Africa.....				68,334	86,819	71,327
Australasia						
Australia:						
Queensland.....	43	125	135	294	2,035	1,825
New South Wales.....	3,381	3,231	3,207	25,879	33,511	39,219
Victoria.....	2,164	2,085	2,569	21,550	27,050	33,974
South Australia.....	2,191	2,080	2,268	20,994	22,174	17,470
Western Australia.....	612	793	1,095	4,496	9,437	13,751
Tasmania.....	37	25	18	681	650	261
Total, Australia.....	7,428	7,339	9,286	73,894	91,880	106,600
New Zealand.....	216	190	167	7,490	5,343	5,559
Total, Australasia.....	7,644	7,429	9,453	81,384	100,217	112,159
Grand Total.....				3,791,951	4,128,711	3,724,535

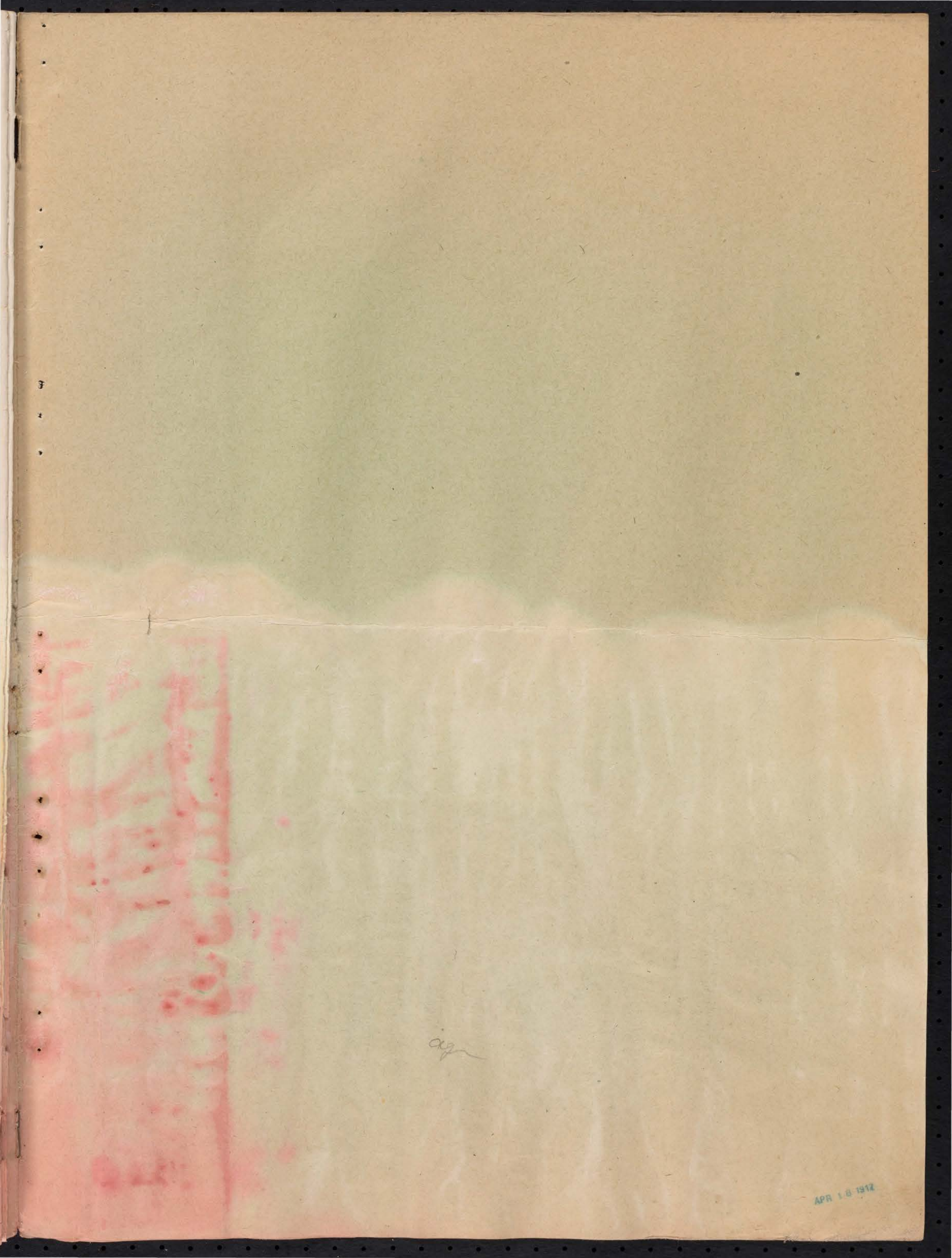
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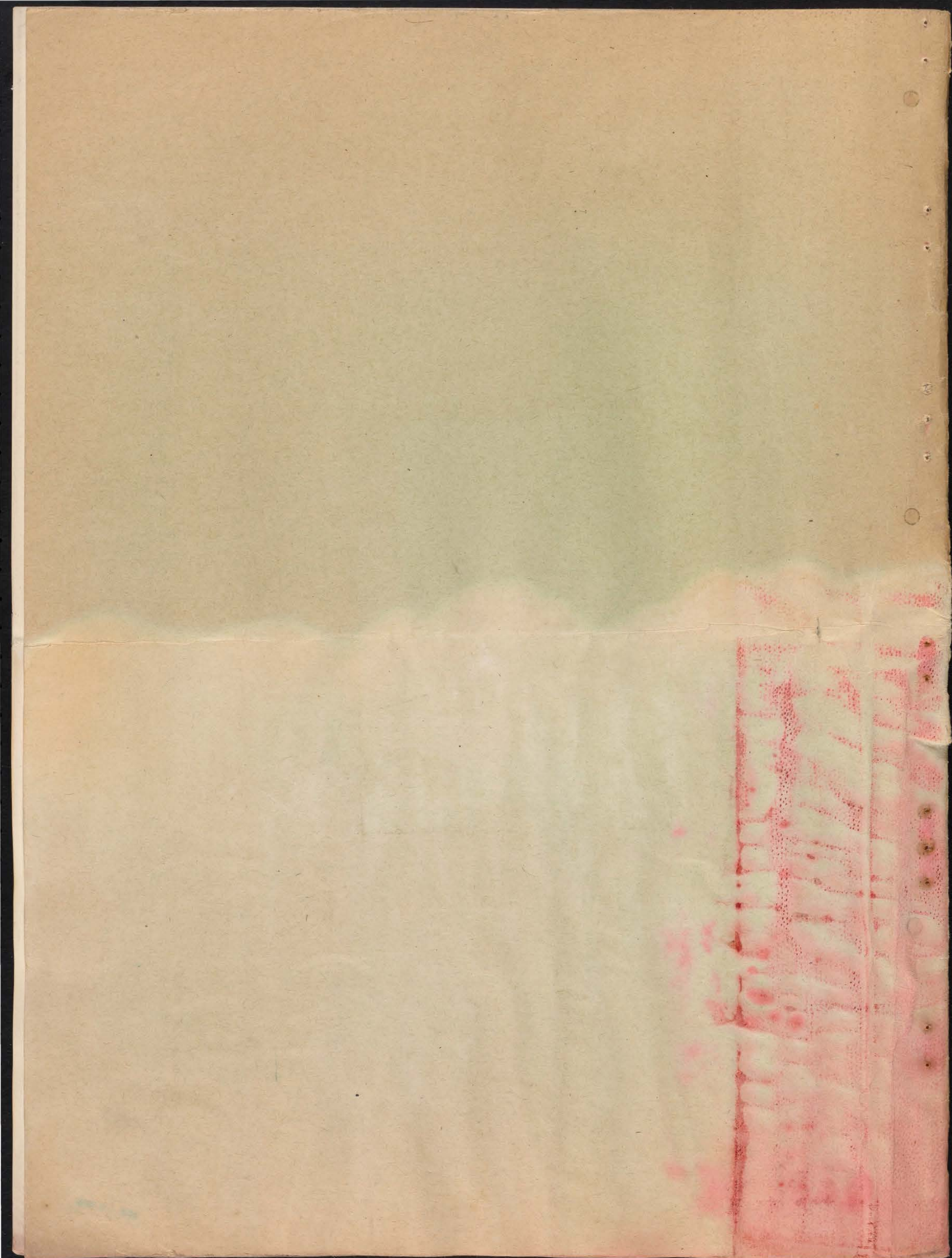
LONG BIG BONE, GRAND CHAMPION POLAND CHINA AT NATIONAL SWINE SHOW, 1916.



GLORIA BENEDICTINE, GRAND CHAMPION JERSEY COW AT NATIONAL DAIRY SHOW, 1916.



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